Output FOM Institute AMOLF 2012

Nanophotonics

NanoOptics	Kobus Kuipers
Photonic Materials	Albert Polman
Photon Scattering	Ad Lagendijk
Surface Photonics	Jaime Gómez Rivas
Resonant Nanophotonics	Femius Koenderink

Molecular Nanophysics

Ultrafast Spectroscopy	Huib Bakker
Biosurface Spectroscopy	Mischa Bonn
Bio Imaging MS	Ron Heeren
Biomolecular Photonics	Yves Rezus
Supramolecular interactions	Mirjam Leunissen

Biomolecular Systems

Bio-assembly & organization	Marileen Dogterom
Biophysics	Sander Tans
Biological Soft Matter	Gijsje Koenderink
Theory of Biomolecular Matter	Bela Mulder
Biochemical Networks	Pieter Rein ten Wolde
Systems Biology	Tom Shimizu

Transition Program

XUV Physics	Marc Vrakking

Peer reviewed Publications	125
Publications in proceedings or other journals	3
Contributions to scientific books (chapters or entire book)	1
PhD theses	13
Open Access publications	29
Invited lectures, posters, awards and other activities	114
Other lectures and posters at (international) conferences and other (scientific) meetings	287
Awards and recognitions	8
Patents	7
Performances on television, radio or at public events	26
Publications in public magazines, newspapers or on the internet	30
Other professional products (software, prototypes, etc.)	7

Group L. Kuipers 2012

Funding

FOM-Projectruimte (PR)
FOM-FEI IPP program (IPP)
FOM-Program Nanoscale Quantum Optics (NQO)
FOM-Program Plasmonics (PLSM)
NanoNextNL Program 6B Functional Nanophotonics (NN6B)
Smartfix Program MEMPHIS (MEMPHIS)

Employees

Hakki Acar (OIO)	IPP
Daryl Beggs (PD)	MEMPHIS
Boris Le Feber (OIO)	PR
Anouk de Hoogh (OIO)	NQO
Aron Opheij (OIO)	MEMPHIS
Nir Rotenberg (PD)	NN6B
Daan Stellinga (stagiair)	-
Ruben van der Wel (OIO)	NN6B
Matthias Wulf (OIO)	PLSM

1. Academic publications

a. Peer reviewed Publications

1. F. van Beijnum, C. Rétif, C.B. Smiet, H. Liu, P. Lalanne, M.P. van Exter, *Quasi-cylindrical wave contribution in experiments on extraordinary optical transmission*, Nature **492**, 411–414 (2012).

2. M. Spasenović, D.M. Beggs, P. Lalanne, T.F. Krauss, L. Kuipers, *Measuring the spatial extent of individual localized photonic states*, Phys. Rev. B **86**, 155153 1-5 (2012).

3. H. Acar, T. Coenen, A. Polman, L. Kuipers, *Dispersive ground plane core shell type optical monopole antennas fabricated with electron beam induced deposition*, ACS Nano **6**, 8226–8232 (2012).

4. D.M. Beggs, I.H. Rey, T. Kampfrath, N. Rotenberg, L. Kuipers, T.F. Krauss, *Ultrafast tunable optical delay line based on indirect photonic transitions*, Phys. Rev. Lett. **108**, 213901 1-4 (2012).

5. N. Rotenberg, M. Spasenović, T.L. Krijger, B. le Feber, F.J. García de Abajo, L. Kuipers, *Plasmon scattering from single subwavelength holes*, Phys. Rev. Lett. **108**, 127402 1-5 (2012).

6. F. van Beijnum, J. Sirre, C. Rétif, M.P. van Exter, *Speckle correlation functions applied to surface plasmons*, Phys. Rev. B **85**, 035437 1-5 (2012).

7. B. Gjonaj, J. Aulbach, P.M. Johnson, A.P. Mosk, L. Kuipers, A. Lagendijk, *Optical control of plasmonic bloch modes on periodic nanostructures*, Nano Lett. **12**, 546–550 (2012).

8. D.M. Beggs, T.F. Krauss, L. Kuipers, T. Kampfrath, *Ultrafast tilting of the dispersion of a photonic crystal and adiabatic spectral compression of light pulses*, Phys. Rev. Lett. **108**, 033902 1-5 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

1. D.M. Beggs, I.H. Rey, T. Kampfrath, N. Rotenberg, L. Kuipers, T.F. Krauss, *Ultrafast tunable optical delay line based on indirect photonic transitions*, Phys. Rev. Lett. **108**, 213901 1-4 (2012). [arXiv:1211.6597]

2. N. Rotenberg, M. Spasenović, T.L. Krijger, B. le Feber, F.J. García de Abajo, L. Kuipers, *Plasmon scattering from single subwavelength holes*, Phys. Rev. Lett. **108**, 127402 1-5 (2012). [arXiv:1212.4035]

3. D.M. Beggs, T.F. Krauss, L. Kuipers, T. Kampfrath, *Ultrafast tilting of the dispersion of a photonic crystal and adiabatic spectral compression of light pulses*, Phys. Rev. Lett. **108**, 033902 1-5 (2012). [arXiv:1211.5240]

4. M. Spasenović, D.M. Beggs, P. Lalanne, T.F. Krauss, L. Kuipers, *Measuring the spatial extent of individual localized photonic states*, Phys. Rev. B **86**, 155153 1-5 (2012). [arXiv:1111.5942]

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. L. Kuipers, *Two new uses for electrons in plasmonics,* 11th CUDOS Workshop, Shoal Bay, Australia, January 31-February 3, 2012.

2. L. Kuipers, *Active control of light propagation in nanophotonic structures,* Verhandlungen der Deutschen Physikalischen Gesellschaft 2012, Berlin, Germany, March 25-30, 2012.

3. L. Kuipers, *Nanophotonics*, Tulip Summer School 2012, Noordwijk, the Netherlands, April 10-13, 2012.

4. L. Kuipers, *Unravelling vector fields at the nanoscale,* SPIE Photonics Europe, Brussels, Belgium, April 16-19, 2012.

5. L. Kuipers, *Ultrafast slow light control,* 10th International Conference on Photonic and Electromagnetic Crystal Structures, Santa Fe, USA, June 4-8, 2012.

6. L. Kuipers, *Near-field mapping of (slow) light,* CIMTEC 2012, Montecatini Terme, Italy, June 10-14, 2012.

7. L. Kuipers, *Up close and optical, light at the nanoscale* , 14th International Conference on Transparent Optical Networks, Coventry, UK, July 2-5, 2012.

8. D.M. Beggs, T. Kampfrath, T.F. Krauss, L. Kuipers, *Ultrafast tilting of the dispersion of a photonic crystal and on-the-fly adiabatic frequency compression of light pulses, invited*, 14th International Conference on Transparent Optical Networks, Coventry, UK, July 2-5, 2012.

9. L. Kuipers, *Controlling light with metals*, SPIE Optics + Photonics, San Diego, USA, August 12-16, 2012.

10. L. Kuipers, *Light control with metal nanostructures*, 17th International Workshop on Microchip Plasmonics, Erlangen, Germany, August 29-31, 2012.

11. L. Kuipers, *Optical control at the nanoscale*, 5th International Workshop on Theoretical and Computational Nano-Photonics, TaCoNa-Photonics 2012, Bad Honnef, Germany, October 24-26, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. A. Opheij, D.M. Beggs, D. Mori, T. Baba, L. Kuipers, *Multiple scattering of slow light in photonic crystal waveguides* (talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. N. Rotenberg, M. Spasenović, T.R. Krijger, B. le Feber, J. Garcia de Abajo, L. Kuipers, *Scattering of surface plasmon polaritons from single sub-wavelength holes* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. D.M. Beggs, T. Kampfrath, T.F. Krauss, L. Kuipers, *Ultrafast tilting of the dispersion of a photonic crystal and on-the-fly adiabatic frequency compression of light pulses* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

4. M. Wulf, D.M. Beggs, N. Rothenberg, T.F. Krauss, L. Kuipers, *Nonlinear pulse distortion measured during wave propagation* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

5. B. le Feber, J. Cesario, N. Rotenberg, L. Kuipers, *Exploiting long-ranged order in quasiperiodic structures for broadband plasmonic excitation* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

6. L. Kuipers, *Light diversion @ the nanoscale* (talk), SOLL Lecture, Swinburne University, Melbourne, Australia, January 31, 2012.

7. D.M. Beggs, N. Rotenberg, T. Kampfrath, I.H. Rey, T.F. Krauss, L. Kuipers, *Optical delay in silicon photonic crystals: accelerating slow-light* (talk), CUDOS@Sydney, Sydney, Australia, February 10, 2012.

8. D.M. Beggs, N. Rotenbeg, T. Kampfrath, I.H. Rey, T.F. Krauss, L. Kuipers, *Optical delay in silicon photonic crystals: accelerating slow-light* (talk), Quantum, Light & Matter Seminar, University of Southampton, Southhampton, UK, July 6, 2012.

9. D.M. Beggs, N. Rotenbeg, T. Kampfrath, I.H. Rey, T.F. Krauss, L. Kuipers, *Optical delay in silicon photonic crystals: accelerating slow-light* (talk), Quantum Photonics Seminar, University of Ottawa, Ottawa, Canada, July 12, 2012.

10. D.M. Beggs, N. Rotenbeg, T. Kampfrath, I.H. Rey, T.F. Krauss, L. Kuipers, *Optical delay in silicon photonic crystals: accelerating slow-light* (talk), University of Sydney, Sydney, Australia, July 17, 2012.

11. L. Kuipers, *Nanoplasmonics* (talk), Debije Nanomaterials Summerschool, Utrecht, the Netherlands, August 28, 2012.

12. N. Rotenberg, M. Spasenović, T.L. Krijger, B. le Feber, F.J. García de Abajo, L. Kuipers, *Understanding plasmon-single subwavelength hole interactions* (talk), NFO 2012, San Sebastian, Spain, September 3-7, 2012.

13. B. le Feber, N. Rotenberg, L. Kuipers, *Towards a complete mapping of electromagnetic near-fields* (talk), NFO 2012, San Sebastian, Spain, September 3-7, 2012.

14. M. Wulf, D.M. Beggs, N. Rotenberg, I.H. Rey, T.F. Krauss, L. Kuipers, *Spectrally-resolved near-field measurements of two-photon absorption in Silicon* (poster), NFO 2012, San Sebastian, Spain, September 3-7, 2012.

15. D.M. Beggs, T.F. Krauss, T. Kampfrath, L. Kuipers, *Ultrafast Tilting of the Dispersion of a Photonic Crystal and Adiabatic Spectral Compression of Light Pulses* (talk), Frontiers in Optics 2012, Rochester, USA, October 14-18, 2012.

16. D.M. Beggs, I.H. Rey, T. Kampfrath, N. Rotenberg, L. Kuipers, T.F. Krauss, *Optical Delay in Photonic Crystals: Accelerating Slow Light* (talk), Frontiers in Optics 2012, Rochester, USA, October 14-18, 2012.

17. D.M. Beggs, I.H. Rey, T. Kampfrath, N. Rotenberg, T.F. Krauss, L. Kuipers, *Ultrafast active control of slow light in silicon photonic crystals* (talk), University of Bristol, Bristol, UK, October 29, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. L. Kuipers, Chair, Nanophysics Advisory board of FOM.

2. L. Kuipers, Member, Oversight committee of the 'Toponderzoeksprogramma Fotonica', a 50 Meuro program on photonics at the University of Eindhoven, 2009-2013.

3. L. Kuipers, International Partner Investigator of CUDOS (Australia), 2008-present.

4. L. Kuipers, Chairman of FOM Scientific advisory board of the FOM-Philips Industrial Partnership Programme 'Microphotonics light sources'.

5. L. Kuipers, Member, International steering committee, Surface Plasmon Photonics conference series.

6. L. Kuipers, Chair, CLEO-Focus at ECOC 2012.

7. L. Kuipers, Member, Programme committee for CLEO 2013,CLEO 2012,NFO-12 & ICONO 2013.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. Participant FOM-FEI IPP.

2. Set up and organized a Nanophotonics lecture course for Philips employees (together with Prof. Reinder Coehoorn).

c. Performances on television, radio or at public events

1. '*Nanolens vertraagd rood laserlicht en kleurt het blauw*', by Margriet van der Heijden, NRC Handelsblad, Wetenschap 2, January 28-29, 2012.

2. Interview for & cited in *'Kunt u mij onzichtbaar maken, meneer?*', De wereldwijde, intrigerende zoektocht naar het geheim achter onzichtbaarheid, p. 58, by Martijn van Calmthout, De Morgen, February 11, 2012.

3. '*Knutselen met licht*', Radio 5 special *Light my fire,* December 14, 2012.

d. Publications in public magazines, newspapers or on the internet

e. Other professional products (software, prototypes, etc.)

Outreach

Group A. Polman 2012

Funding

FOM-Program Nanophotovoltaics (NPV)
FOM-Program Plasmonics (PLSM)
NanoNextNL Program 6D Nanophotonic Devices (NN6D)
NanoNextNL Program 9A Nano-Inspection and Characterization (NN9A)
ERC Advanced Grant (ERC)
Global Energy and Climate Project (GCEP)

Employees

Benjamin Brenny (OIO)	NN6D
Toon Coenen (OIO)	NN9A
Jorik van de Groep (OIO)	GCEP, NPV
Marie Anne van de Haar (OIO)	ERC
Claire van Lare (OIO)	NPV
Ruben Maas (OIO)	ERC
Pierpaolo Spinelli (OIO)	NPV
Rutger Thijssen (OIO)	ERC

1. Academic publicatioons

a. Peer reviewed Publications

1. D.T. Schoen, T. Coenen, F.J. García de Abajo, M.L. Brongersma, A. Polman, *Planar parabolic optical antennas*, Nano Lett. **12** (2012) online first, DOI: 10.1021/nl303850v.

2. M.C. van Lare, F.O. Lenzmann, M.A. Verschuuren, A. Polman, *Mode coupling by plasmonic surface scatterers in thin-film silicon solar cells*, Appl. Phys. Lett. **101**, 221110 1-4 (2012).

3. P. Spinelli, A. Polman, *Prospects of near-field plasmonic absorption enhancement in semiconductor materials using embedded Ag nanoparticles*, Opt. Express **20**, A641-A654 (2012).

4. H. Acar, T. Coenen, A. Polman, L. Kuipers, *Dispersive ground plane core shell type optical monopole antennas fabricated with electron beam induced deposition*, ACS Nano **6**, 8226–8232 (2012).

5. R. Sapienza, T. Coenen, J. Renger, M. Kuttge, N.F. van Hulst, A. Polman, *Deep-subwavelength imaging of the modal dispersion of light*, Nature Mater. **11**, 781–787 (2012).

6. T. Coenen, A. Polman, *Polarization-sensitive cathodoluminescence Fourier microscopy*, Opt. Express **20**, 18679-18691 (2012).

7. J. van de Groep, P. Spinelli, A. Polman, *Transparent conducting silver nanowire networks*, Nano Lett. **12**, 3138–3144 (2012).

8. A. Polman, H.A. Atwater, *Photonic design principles for ultrahigh-efficiency photovoltaics*, Nature Mater. **11**, 174–177 (2012).

9. P. Spinelli, M.A. Verschuuren, A. Polman, *Broadband omnidirectional antireflection coating based on subwavelength surface Mie resonators*, Nature Commun. **3**, 692 1-5 (2012).

10. P. Spinelli, V.E. Ferry, J. van de Groep, M.C. van Lare, M.A. Verschuuren, R.E.I. Schropp, H.A. Atwater, A. Polman, *Plasmonic light trapping in thin-film Si solar cells*, J. Opt. **14**, 024002 1-11 (2012).

11. T. Coenen, E.J.R. Vesseur, A. Polman, *Deep-subwavelength spatial characterization of angular emission from single-crystal Au plasmonic ridge nanoantennas*, ACS Nano **6**, 1742–1750 (2012).

12. S. Bidault, A. Polman, *Water-based assembly and purification of plasmon-coupled gold nanoparticle dimers and trimers*, Int. J. Opt. **2012**, 387274 1-5 (2012).

b. Publications in proceedings or other journals

1. E.J.R. Vesseur, J. Aizpurua, T. Coenen, A. Reyes-Coronado, P.E. Batson, A. Polman, *Plasmonic excitation and manipulation with an electron beam*, MRS Bull. **37**, 752-760, 2012.

2. A. Polman, *Electrically induced modulation of surface plasmon polaritons,* Bas Zegers, Master Thesis, July 10, 2012.

3. A. Polman, *Limiting and realistic efficiencies of multi-junction solar cells,* Hugo Doeleman, Master Thesis, August 7, 2012.

4. T. Coenen, M. Frimmer, A. Polman, A.F. Koenderink, *Antennes bepalen waarheen en hoe snel een foton uitgezonden wordt*, Nederlands Tijdschrift van Natuurkunde **78**, 62-66, 2012.

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. A. Polman, *Angle-resolved cathodoluminescence imaging spectroscopy of plasmonic materials and metamaterials*, MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

2. V.E. Ferry, *Plasmonic nanostructures for light trapping in ultrathin film solar cells,* MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

3. A. Polman, *Angle-resolved cathodoluminescence imaging spectroscopy of plasmonic metamaterials,* SPIE Photonics Europe, Brussels, Belgium, April 16-20, 2012.

4. P. Spinelli, *Efficient light trapping in thin-film Si solar cells using Mie resonators,* SPIE Photonics Europe, Brussels, Belgium, April 16-20, 2012.

5. A. Polman, *Plasmonic metamaterials and opto-mechanics,* E-MRS Spring Meeting, Strasbourg, France, May 14-18, 2012.

6. A. Polman, *Nano-optics with electrons,* E-MRS Spring Meeting, Strasbourg, France, May 14-18, 2012.

7. A. Polman, *Optics with electrons*, Gordon Conference on Plasmonics, Waterville, USA, June 10-15, 2012.

8. A. Polman, *Plasmonic MIM waveguides: integrated circuits, sources and nanomechanics*, 17th International Workshop on Microchip Plasmonics, Erlangen, Germany, August 29-31, 2012.

9. T. Coenen, *Optics with electron beams in plasmonic metamaterials*, Photon12, Durham, UK, September 3-6, 2012.

10. A. Polman, *Angle-resolved cathodoluminescence imaging spectroscopy,* NFO 2012, San Sebastian, Spain, September 3-7, 2012.

11. V.E. Ferry, *Light trapping in thin-film and quantum dot solar cells,* IEEE Photonics, Burlingame, USA, September 24-28, 2012.

12. P. Spinelli, *Light management for photovoltaics*, Workshop Nanophotonics for Photovoltaics, Valencia, Spain, November 6-7, 2012.

13. V.E. Ferry, *Light trapping in thin-film and quantum dot solar cells,* Workshop Nanophotonics for Photovoltaics, Valencia, Spain, November 6-7, 2012.

14. A. Polman, *Light management for photovoltaics,* Optics for Solar Energy, Eindhoven, the Netherlands, November 11-14, 2012.

15. A. Polman, *Towards ultrahigh efficiency solar cells using light scattering structures,* MRS Fall Meeting, Boston, USA, November 25-30, 2012.

16. A. Polman, *Nanotechnology for ultra-high-efficiency solar cells,* MicroNano Conference, Ede, the Netherlands, December 10-11, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. R. Thijssen, *Optomechanic coupling using plasmonic nanoantennas* (talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. T. Coenen, E.J.R. Vesseur, A. Polman, *Probing the optical properties of gold nanoantennae using an electron beam* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. E.J.R. Vesseur, T. Coenen, H. Caglayan, N. Engheta, A. Polman, *Experimental demonstration of n=0 in metal-insulator-metal waveguides at cutoff* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

4. J. van de Groep, P. Spinelli, M.C. van Lare, F. Lenzmann, M. Verschuuren, R.E.I. Schropp, A. Polman, *Light management in thin solicon solar cells using metal and dielectric nanostructures* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

5. R. Maas, M.A. van de Haar, H. Schokker, J. Parsons, E. Verhagen, A. Polman, *Experimental demonstration of negative refraction in the UV/blue* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

6. A. Polman, *Cathodoluminescence plasmon microscopy* (talk), University of Stuttgart, Stuttgart, Germany, January 31, 2012.

7. R. Thijssen, *Optomechanics with plasmons* (poster), Gordon Conference on Mechanical Systems in the Quantum Regime, Galveston, USA, March 4-9, 2012.

8. A. Polman, *Light management in nanostructured solar cells* (talk), Energy Days, Technical University Eindhoven, Eindhoven, the Netherlands, March 8, 2012.

9. R. Thijssen, A. Polman, *Strong opto-mechanical coupling in plasmonic Fabry-Perot cavities* (talk), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

10. P. Spinelli, *Mie scattering for light trapping in GaAs solar cells* (talk), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

11. T. Coenen, A. Polman, *Probing Plasmonic Field Components at the Nanoscale* (talk), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

12. J. van de Groep, P. Spinelli, A. Polman, *Transparent conducting silver nanowire networks* (talk), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

13. R. Maas, J. Parsons, E. Verhagen, A. Polman, *Optical metamaterial with a negative index of refraction in the UV* (talk), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

14. M.C. van Lare, M.A. Verschuuren, F. Lenzmann, A. Polman, *Light trapping in thin film Si solar cells* (poster), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

15. M.A. van de Haar, *Three-dimensional Coaxial Plasmonic Metamaterial at Visible/UV Frequencies* (poster), Metamorphose Summer School, Louvain-la-Neuve, Belgium, May 9, 2012.

16. A. Polman, *Moonwalk for light: demonstration of negative refractional light* (talk), FYSICA-CHEMIE 2012, Enschede, the Netherlands, May 30, 2012.

17. T. Coenen, J. van de Groep, A. Polman, *Probing the optical properties of a single gold nanoparticle using an electron beam* (talk), Gordon Conference on Plasmonics, Waterville, USA, June 10-15, 2012.

18. T. Coenen, J. van de Groep, R. Sapienza, M. Kuttge, J. Renger, N.F. van Hulst, A. Polman, *Probing the optical properties of metallic and dielectric nanostructures using cathodoluminescence spectroscopy* (poster), Gordon Conference on Plasmonics, Waterville, USA, June 10-15, 2012.

19. J. van de Groep, P. Spinelli, A. Polman, *Transparent conducting silver nanowire networks* (talk), European Workshop on Nano Transparent Conductive Materials, Grenoble, France, June 14-15, 2012.

20. M.A. van de Haar, A. Polman, *Three-dimensional Coaxial Plasmonic Metamaterial at Visible/UV Frequencies* (talk), Metamaterials 2012, St. Petersburg, Russia, September 17-22, 2012.

21. R. Maas, J. Parsons, E. Verhagen, A. Polman, *Optical metamaterial with a negative index of refraction in the UV* (talk), Metamaterials 2012, St. Petersburg, Russia, September 17-22, 2012.

22. J. van de Groep, P. Spinelli, A. Polman, *Transparent conducting silver nanowire networks*, (talk), 27th European Photovoltaic Solar Energy Conference, Frankfurt, Germany, September 22-23, 2012.

23. P. Spinelli, *Light trapping in thin-film Si solar cells using Mie scatterers* (talk), 27th European Photovoltaic Solar Energy Conference, Frankfurt, Germany, September 22-23, 2012.

24. M.C. van Lare, M.A. Verschuuren, F. Lenzmann, V.E. Ferry, R.E.I. Schropp, H.A. Atwater, A. Polman, *Light trapping in thin film Si solar cells using dielectric and metallic scatterers* (talk), 27th European Photovoltaic Solar Energy Conference, Frankfurt, Germany, September 22-23, 2012.

25. A. Polman, *Energy from the sun* (talk), Amsterdam University College, Solar Energy, Amsterdam, the Netherlands, October 9, 2012.

26. A. Polman, *Angle-resolved cathodoluminescence imaging spectroscopy* (talk), Debye Institute, Utrecht, the Netherlands, October 18, 2012.

27. A. Polman, *Energy from the sun* (talk), Energy 4 Next Generations, Amsterdam, the Netherlands, November 2, 2012.

28. A. Polman, *Ultra high efficiency solar cells with nanophotonic design* (talk), SunDay, ´s-Hertogenbosch, the Netherlands, November 7, 2012.

29. A. Polman, *Plasmonic metamaterials* (talk), Cobra Colloquium, Technical University of Eindhoven, Eindhoven, the Netherlands, November 9, 2012.

30. J. van de Groep, P. Spinelli, A. Polman, *Resonant Conducting Optically Transparent Network Electrode for Thin-film Solar Cells* (talk), OSA Renewable Energy and the Environment, Eindhoven, the Netherlands, November 11-14, 2012.

31. P. Spinelli, *Light trapping in thin crystalline Si solar cells using Mie scatterers* (talk), OSA Renewable Energy and the Environment, Eindhoven, the Netherlands, November 11-14, 2012.

32. B.J.M. Brenny, T. Coenen, A. Polman, *Cathodoluminescence imaging spectroscopy of nanolaser and nanowaveguide materials* (poster), MicroNano Conference, Ede, the Netherlands, December 10-11, 2012.

33. M.C. van Lare, M.A. Verschuuren, F. Lenzmann, A. Polman, *Mode-coupling by plasmonic surface scatterers in thin film Si solar cells* (poster), MicroNano Conference, Ede, the Netherlands, December 10-11, 2012.

34. A. Polman, *Ultra high efficiency solar cells with nanophotonic design* (talk), Technical University of Eindhoven, Eindhoven, the Netherlands, December 13, 2012.

c. Awards and recognitions

1. A. Polman, ENI Renewable and Non-Conventional Energy Prize 2012.

2. E.J.R. Vesseur, FOM PhD thesis Valorization Chapter Prize 2012.

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. A. Polman, Co-guest editor, Green photonics, Special issue of J. Opt. (2011).

2. A. Polman, Member, Editorial Board, Nano Lett. (ACS).

3. A. Polman, Member, Program committee Joint Solar Program.

4. A. Polman, Member, Advisory Board, Centre of Excellence for Advanced Silicon Photovoltaics and photonics, University of New South Wales (Australia).

5. A. Polman, Member, Young Energy Scientists (YES!) Advisory Board (FOM).

6. A. Polman, Co-chair, Symposium *Optical nanostructures and advanced materials for photovoltaics* at the OSA Renewable Energy and the Environment Congress, Eindhoven, November 11-14, 2012.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. Collaboration with Philips Research (M.A. Verschuuren) on soft imprint lithography.

2. Collaboration with Philips Research (H.A. van Sprang) on nanophotonics, Industrial Partnership Program Improved Solid State Lighting.

3. Board member of NanoNextNL: 125 M€ national nanoscience and technology program.

4. Technology transfer to Delmic B.V, Delft, on the angle-resolved cathodoluminescence imaging spectroscopy technique (ARCIS).

5. Collaboration with ECN (Frank Lenzmann) on crystalline Si solar cells with dielectric and plasmonic scatterers.

6. Organizer Workshop Amsterdam Solar Energy Initiative (Solardam), November, 16, 2012.

c. Performances on television, radio or at public events

1. J. van de Groep, *Hoe maken we een ultra-efficiënte zonnepaneel?,* Energie Café gemeente Amsterdam, February 14, 2012.

2. A. Polman, *Ultra-efficiënte zonnecellen*, Interview Hoe Zo!? Radio 5, February 21, 2012.

3. A. Polman, *Ultra-efficiënte zonnecellen*, Interview Amsterdam FM radio, February 21, 2012.

4. A. Polman, *Ultra-efficiënte zonnecellen*, Interview EénVandaag Television, February 22, 2012.

5. A. Polman, *Ultra-efficiënte zonnecellen,* Interview BNR Nieuwsradio, February 24, 2012.

6. A. Polman, *Ultra-efficiënte zonnecellen,* Interview KRO Goedemorgen Radio 2, February 27, 2012.

7. A. Polman, *Ultra-efficiënte zonnecellen*, Interview Dichtbij Nederland Radio, March 8, 2012.

8. A. Polman, *Licht management verdubbelt PV rendement*, New-energy.tv, March 14, 2012.

9. A. Polman, *ENI prijs voor Albert Polman en Harry Atwater*, Interview Amsterdam FM Radio, May 22, 2012.

10. A. Polman, *Amsterdamse onderzoeker wint energieprijs,* Interview Radio Noord-Holland, June 13, 2012.

11. A. Polman, *Amsterdamse onderzoeker wint energieprijs,* Interview Radio 1, June 15, 2012.

12. A. Polman, *Oneindig snel licht door een nanobuisje,* HoeZo!? Radio, December 19, 2012.

d. Publications in public magazines, newspapers or on the internet

1. *Succes voor FOM en Philips*, Eindhovens Dagblad, February 21, 2012.

2. *Superefficiënte zonnecel op komst,* het Parool, February 22, 2012.

3. *Zwart gat silicium helpt zonnecel,* De Volkskrant, February 22, 2012.

4. *De zon levert steeds meer energie op*, NRC Handelsblad, March 9, 2012.

5. *Amsterdamse onderzoeker wint energieprijs,* Het Parool, May 21, 2012.

6. *FOM onderzoek naar zonnecellen wint grote Italiaans energieprijs*, Eindhovens Dagblad, May 22, 2012.

7. *When Harry met Albert*, NRC Handelsblad, May 26, 2012.

8. *Hollands Dagboek – Albert Polman*, NRC Handelsblad, June 16, 2012.

9. *Science Park Amsterdam in beeld,* Het Parool, September 8, 2012.

10. *Publiceren op de cover van Nature,* De Volkskrant, September 28, 2012.

11. *Licht op chip door Einsteins limieten,* De Volkskrant, November 9, 2012.

e. Other professional products (software, prototypes, etc.)

1. Ultra-thin silicon solar cells based on light trapping nanopatterns.

Outreach

1. A. Polman, Student lecture on photovoltaics, University of Amsterdam, March 5, 2012.

2. A. Polman, Photovoltaics, 3 lectures in master course Advanced Materials and Energy Physics (AMEP), University of Amsterdam, 2012.

Group A. Lagendijk 2012

Funding

FOM-Program Photons in Complex Media (PCM)
FOM-Shell IPP program iPOG (iPOG)
FOM-Projectruimte (PR)
STW project (STW)

Employees

Jochen Aulbach (OIO)	iPOG
Timmo van der Beek (OIO)	PCM
Ramy El-Dardiry (OIO)	PR
Bergin Gjonai (OIO)	PCM
Patrick Johnson (PD)	STW

1. Academic publicationds

a. Peer reviewed Publications

1. R.G.S. El-Dardiry, R. Mooiweer, A. Lagendijk, *Experimental phase diagram for random laser spectra*, New J. Phys. **14**, 113031 1-11 (2012).

2. C. Blum, N. Zijlstra, A. Lagendijk, M. Wubs, A.P. Mosk, V. Subramaniam, W.L. Vos, *Nanophotonic control of the Förster resonance energy transfer efficiency*, Phys. Rev. Lett. **109**, 203601 1-5 (2012).

3. J. Bertolotti, E.G. van Putten, C. Blum, A. Lagendijk, W.L. Vos, A.P. Mosk, *Non-invasive imaging through opaque scattering layers*, Nature, **491**, 232-234 (2012).

4. S.R. Huisman, G. Ctistis, S. Stobbe, A.P. Mosk, J.L. Herek, A. Lagendijk, P. Lodahl, W.L. Vos, P.W.H. Pinkse, *Measurement of a band-edge tail in the density of states of a photonic-crystal waveguide*, Phys. Rev. B **86**, 155154 1-5 (2012).

5. R.G.S. El-Dardiry, S. Faez, A. Lagendijk, *Snapshots of Anderson localization beyond the ensemble average*, Phys. Rev. B **86**, 125132 1-4 (2012).

6. O.L. Muskens, P. Venn, T. van der Beek, T. Wellens, *Partial nonlinear reciprocity breaking through ultrafast dynamics in a random photonic medium*, Phys. Rev. Lett. **108**, 223906 1-5 (2012).

7. A.P. Mosk, A. Lagendijk, G. Lerosey, M. Fink, *Controlling waves in space and time for imaging and focusing in complex media*, Nature Photon. **6**, 283-292 (2012).

8. E.G. van Putten, A.P. Mosk, A. Lagendijk, *Nonimaging speckle interferometry for high-speed nanometer-scale position detection*, Opt. Lett. **37**, 1070-1072 (2012).

9. T. van der Beek, P. Barthelemy, P.M. Johnson, D.S. Wiersma, A. Lagendijk, *Light transport through disordered layers of dense gallium arsenide submicron particles*, Phys. Rev. B **85**, 115401 1-11 (2012).

10. J. Aulbach, A. Bretagne, M. Fink, M. Tanter, A. Tourin, *Optimal spatiotemporal focusing through complex scattering media*, Phys. Rev. E **85**, 016605 1-7 (2012).

11. B. Gjonaj, J. Aulbach, P.M. Johnson, A.P. Mosk, L. Kuipers, A. Lagendijk, *Optical control of plasmonic bloch modes on periodic nanostructures*, Nano Lett. **12**, 546–550 (2012).

b. Publications in proceedings or other journals

1. A. Lagendijk, B.A. van Tiggelen, D.S. Wiersma, *Notes on Anderson localization: reply*, Phys. Today **65**, 11-12 (2012).

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. R.G.S. El-Dardiry, *Sources and gain in photonic random media*, University of Amsterdam, June 20, 2012.

2. B. Gjonaj, *Digital plasmonics: from concept to microscopy*, University of Amsterdam, July 4, 2012.

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. A. Lagendijk, *Classical waves: from transverse localization to Lifshitz tails,* Conference on Disordered Quantum Systems**,** Paris, France, June 18–22, 2012.

2. A. Lagendijk, *Looking and imaging through non-transparent materials,* VU-LaserLab symposium, Amsterdam, the Netherlands, December 7, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. J. Aulbach, *Ultimate Design and Control of Complex Wave Fronts* (talk), Shell-FOM iPoG-I Meeting Committee, Rijswijk, the Netherlands, January 13, 2012.

2. T. van der Beek, M. Tachikirt, P.M. Johnson, A. Lagendijk, *Broad band frequency correlation microscopy* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. B. Gjonaj, *Digital plasmonics: from concept to microscopy* (talk), Helmotz Institute, Munich, Germany, February, 2012.

4. B. Gjonaj, *Digital plasmonics: from concept to microscopy* (talk), Max-Planck Institute, Göttingen, Germany, February, 2012.

5. B. Gjonai, *Digital plasmonics: from concept to microscopy* (talk), Technion-Israel Institute of Technology, Haifa, Israel, March, 2012.

6. J. Aulbach, *Optimal spatiotemporal focusing through complex scattering media* (talk), CLEO 2012, San Jose, USA, May 6-11, 2012.

7. A. Lagendijk, *The difference between becoming a good or a successful scientist* (talk), ANP Retreat 2012, Nijverdal, the Netherlands, June 21-22, 2012.

8. T. van der Beek, *3D Anderson localization of light in GaAs revisited* (talk), ETOPIM 2012, Marseille, France, September 2-7, 2012.

9. O.L. Muskens, T. van der Beek, A.F. Koenderink, W.L. Vos, A. Lagendijk, *Broadband spectroscopy of static and dynamic light transport in nanomaterials* (poster), ETOPIM, Marseille, France, September 2-7, 2012.

10. J. Aulbach, *Ultimate Design and Control of Complex Wave Fronts* (talk), Shell-FOM iPoG-I Meeting Committee, Rijswijk, the Netherlands, September 13, 2012.

11. T. van der Beek, *3D Anderson localization of light in GaAs* (talk), COPS, University of Twente, Enschede, the Netherlands, September 14, 2012.

12. A. Lagendijk, *Light propagation in complex media* (talk), Lecture Philips-AMOLF Nanophotonics Course, Eindhoven, the Netherlands, October 31, 2012.

13. A. Lagendijk, *How to become a leading scientist* (talk), Onderzoeksretraite ErasmusMC, Huisartsgeneeskunde, Berg en Dal, the Netherlands, November 9, 2012.

14. A. Lagendijk, *Looking in and through opaque materials* (talk), KNAW Physics Section, Amsterdam, the Netherlands, November 26, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. A. Lagendijk, Member, Royal Netherlands Academy of Sciences (KNAW).

2. A. Lagendijk, Program manager, FOM-program Waves in Complex Media.

3. Knowledge transfer (societal and economic)

a. Patents

1. Bergin Gjonaj, Patrick Johnson, *Scanning Plasmonic Microscope*, European Patent Application 12165040.2, Submitted September 8, 2012.

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. Collaboration with Shell within FOM-IPP program iPOG.

2. Collaboration with Philips Lighting through STW granted proposal.

3. Collaboration with AKZO and Dutch Cultural Heritage Foundation, through granted STW.

c. Performances on television, radio or at public events

1. A. Lagendijk, *In het land der Reuzen,* Symposium: Reuzen van de Lage Landen en de toekomst van het Nederlandse toponderzoek, Leiden, the Netherlands.

2. A. Lagendijk, *Scientific Fraud: How it is done, why it is done, and what can be done about*, Eleventh Ethical Forum of the University Foundation, Brussels, Belgium, November 29, 2012.

d. Publications in public magazines, newspapers or on the internet

1. A. Lagendijk, *Egoïsme is essentieel in de wetenschap*, NRC, Opinie & Debat, May 23, 2012.

2. A. Lagendijk, *Volg vooral geen technische opleiding,* NRC, Opinie & Debat, December 17, 2012.

3. A. Lagendijk e.a., Survival blog for scientists, n.a.v. zijn boek Interferentie, blog van Ad Lagendijk.

e. Other professional products (software, prototypes, etc.)

Outreach

1. A. Lagendijk, Survival Guide for Scientists, 1 trimester lecture series, University of Amsterdam, in collaboration with Ramy El-Dardiry en Timmo van der Beek.

Group J. Gómez Rivas 2012

Funding

FOM-IPP Improved solid state light sources (SSL)
FOM-Program Nanophotovoltaics (NPV)
FOM-Program Plasmonics (PLSM)
ERC Starting Grant (ERC)
NanoNext NL Program 6B Functional Nanophotonics (NN6B)
NanoNext NL Program 6D Active Photonic Devices (NN6D)
Grant Japanese government (JAPAN)

Employees

Tommy Barten (stagiair)	SSL
Audrey Berrier (PD)	NN6B
George Georgiou (OIO)	ERC
Karsten Goede (PD)	NN6B
Grzegorz Grzela (OIO)	NPV
Davy Louwers (stagiair)	SSL
Gabriel Lozano Barbero (PD)	NN6D
Astrid Munckhof (stagiair)	SSL
Shunsuke Murai (guest)	JAPAN
Giuseppe Pirruccio (OIO)	SSL
Said Rahimzadeh-Kalaleh Rodriguez (OIO)	SSL
Martijn Schaafsma (OIO)	PLSM
Rik Starmans (stagiair)	PLSM
Tom Steinbusch (stagiair)	ERC
Hemant Tyagi (PD)	SSL
Frank Verniers (stagiair)	SSL

1. Academic publications

a. Peer reviewed Publications

1. A. Berrier, P. Albella, M.A. Poyli, R. Ulbricht, M. Bonn, J. Aizpurua, J. Gómez Rivas, *Detection of deep-subwavelength dielectric layers at terahertz frequencies using semiconductor plasmonic resonators*, Opt. Express **20**, 5052-5060 (2012).

2. S.R.K. Rodriguez, G. Lozano, M.A. Verschuuren, R. Gomes, K. Lambert, B. de Geyter, A. Hassinen, D. van Thourhout, Z. Hens, J. Gómez Rivas, *Quantum rod emission coupled to plasmonic lattice resonances: A collective directional source of polarized light*, Appl. Phys. Lett. **100**, 111103 1-3 (2012).

3. S.L. Diedenhofen, G. Grzela, E. Haverkamp, G. Bauhuis, J. Schermer, J. Gómez Rivas, *Broadband and omnidirectional anti-reflection layer for III/V multi-junction solar cells*, Sol. Energy Mater. Sol. Cells **101**, 308–314 (2012).

4. G. Pirruccio, G. Lozano, Y. Zhang, S.R.K. Rodriguez, R. Gomes, Z. Hens, J. Gómez Rivas, *Coherent absorption and enhanced photoluminescence in thin layers of nanorods*, Phys. Rev. B **85**, 165455 1-6 (2012).

5. Y. Zhang, C. Arnold, P. Offermans, J. Gómez Rivas, *Surface wave sensors based on nanometric layers of strongly absorbing materials*, Opt. Express **20**, 9431-9441 (2012).

6. G. Grzela, D. Hourlier, J. Gómez Rivas, *Polarization dependent light extinction in ensembles of polydisperse, vertical semiconductor nanowires : a Mie scattering effective medium*, Phys. Rev. B **86**, 045305 1-7 (2012).

7. S. Murai, M.A. Verschuuren, G. Lozano, G. Pirruccio, A.F. Koenderink, J. Gómez Rivas, *Enhanced absorption and emission of $Y_3Al_5O_{12}$:Ce^{3+} thin layers prepared by epoxide-catalyzed sol-gel method*, Opt. Mater. Express **2**, 1111-1120 (2012).

8. G. Grzela, R. Paniagua-Domínguez, T. Barten, Y. Fontana, J.A. Sánchez-Gil, J. Gómez Rivas, *Nanowire antenna emission*, Nano Lett. **12**, 5481–5486 (2012).

9. S.R.K. Rodriguez, M.C. Schaafsma, A. Berrier, J. Gómez Rivas, *Collective resonances in plasmonic crystals: size matters*, Physica B **407**, 4081–4085 (2012).

10. S.R.K. Rodriguez, S. Murai, M.A. Verschuuren, J. Gómez Rivas, *Light-emitting waveguide-plasmon polaritons*, Phys. Rev. Lett. **109**, 166803 1-5 (2012).

11. A. Berrier, M.C. Schaafsma, G. Nonglaton, J. Bergquist, J. Gómez Rivas, *Selective detection of bacterial layers with terahertz plasmonic antennas*, Biomed. Opt. Express **3**, 2937-2949 (2012).

12. C. Arnold, Y. Zhang, J. Gómez Rivas, *Modified light emission from emitters coupled to long-range guided modes in strongly absorbing layers*, Opt. Express **20**, 27554-27561 (2012).

13. R. Sczech, J. Gómez Rivas, A. Berrier, V. Giannini, G. Pirruccio, C. Debus, H. Schäfer-Eberwein, P. Haring Bolivar, *Long-range guided THz radiation by thin layers of water*, Opt. Express **20**, 27781-27791 (2012).

14. Y. Fontana, G. Grzela, E.P.A.M. Bakkers, J. Gómez Rivas, *Mapping the directional emission of quasi-two-dimensional photonic crystals of semiconductor nanowires using Fourier microscopy*, Phys. Rev. B **86**, 245303 1-7 (2012).

b. Publicaties in proceedings c.q. andere tijdschriften

c. Bijdragen aan wetenschappelijke boeken (hoofdstukken dan wel het gehele boek)

d. PhD theses

e. Open Access publications

1. A. Berrier, P. Albella, M.A. Poyli, R. Ulbricht, M. Bonn, J. Aizpurua, J. Gómez Rivas, *Detection of deep-subwavelength dielectric layers at terahertz frequencies using semiconductor plasmonic resonators*, Opt. Express **20**, 5052-5060 (2012).

2. Y. Zhang, C. Arnold, P. Offermans, J. Gómez Rivas, *Surface wave sensors based on nanometric layers of strongly absorbing materials*, Opt. Express **20**, 9431-9441 (2012).

3. S. Murai, M.A. Verschuuren, G. Lozano, G. Pirruccio, A.F. Koenderink, J. Gómez Rivas, *Enhanced absorption and emission of $Y_3Al_5O_{12}$:Ce^{3+} thin layers prepared by epoxide-catalyzed sol-gel method*, Opt. Mater. Express **2**, 1111-1120 (2012).

4. A. Berrier, M.C. Schaafsma, G. Nonglaton, J. Bergquist, J. Gómez Rivas, *Selective detection of bacterial layers with terahertz plasmonic antennas*, Biomed. Opt. Express **3**, 2937-2949 (2012).

5. C. Arnold, Y. Zhang, J. Gómez Rivas, *Modified light emission from emitters coupled to long-range guided modes in strongly absorbing layers*, Opt. Express **20**, 27554-27561 (2012).

6. R. Sczech, J. Gómez Rivas, A. Berrier, V. Giannini, G. Pirruccio, C. Debus, H. Schäfer-Eberwein, P. Haring Bolivar, *Long-range guided THz radiation by thin layers of water*, Opt. Express **20**, 27781-27791 (2012).

7. S.R.K. Rodriguez, M.A. Verschuuren, J. Gómez Rivas, *Bose Einstein condensation of plexitons.* [arXiv:1210.7086]

8. S.L. Diedenhofen, G. Grzela, E. Haverkamp, G. Bauhuis, J. Schermer, J. Gómez Rivas, *Broadband and omnidirectional anti-reflection layer for III/V multi-junction solar cells*, Sol. Energy Mater. Sol. Cells **101**, 308–314 (2012). [arXiv:1210.6601]

9. X.M. Bendaña, G. Lozano, G. Pirruccio, J. Gómez Rivas, F.J. García de Abajo, *Excitation of confined modes on particle arrays*. [arXiv:1209.2626]

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. J. Gómez Rivas, *Modified quantum dot emission with arrays of plasmonic nanoparticles,* 8th EOS Topical Meeting on Diffractive Optics, Delft, the Netherlands, February 27–March 1, 2012.

2. J. Gómez Rivas, *Metallic and semiconducting nanoantennas*, Nanolight, Benasque, Spain, March 11-17, 2012.

3. J. Gómez Rivas, *Semiconductor surfaces for plasmonic sensing at THz frequencies,* Europtrode XI, Barcelona, Spain, April 1-4, 2012.

4. J. Gómez Rivas, *Metallic and semiconducting nanoantennas,* META'12, Paris, France, April 19-22, 2012.

5. G. Lozano, *Modified quantum rod emission by collective resonances in arrays of plasmonics particles*, META'12, Paris, France, April 19-22, 2012.

6. J. Gómez Rivas, *Semiconductor and plasmonic antennas,* Advanced Processes in Optical Sensing and Photonic Applications, Miraflores de la Sierra, Madrid, Spain, May 21-25, 2012.

7. S.R.K. Rodriguez, *Plasmonic nano-antenna arrays: Enhancing the performance of photonic devices*, IAP 7: First Annual Meeting, Université Libre de Bruxelles, Brussels, Belgium, October 19, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. G. Grzela, S.L. Diedenhofen, O.T.A. Janssen, E.P.A.M. Bakkers, H.P. Urbach, J. Gómez Rivas, *Controlling light absorption by semiconductor nanowires* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. G. Lozano, S.R.K. Rodriguez, G. Pirruccio, S. Murai, M.A. Verschuuren, M. Jongerius, R. Gomes, Z. Hens, J. Gómez Rivas, *Enhancing the performance of light emitters by using nanophotonic structures* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. P. Albella, P. Alonso, D. Weber, A. Berrier, J. Gómez-Rivas, A. Pucci, R. Hillenbrand, J. Aizpurua, *Plasmonic Antennas: From Optics to THz* (poster), NanoSpain, Santander, Spain, February 27-March 1, 2012.

4. G. Pirruccio, G. Lozano, Y. Zhang, S.R.K. Rodriguez, R. Gomes, Z. Hens, J. Gómez Rivas, *Coherent absorption and enhanced photoluminescence of very thin layer of nanorods* (poster), Nanolight, Benasque, Spain, March 11-17, 2012.

5. S. Murai, M.A. Verschuuren, G. Lozano, G. Pirruccio, S.R.K. Rodriguez, J. Gómez Rivas, *Tailoring the emission of thin layers of Y3Al5O12:Ce3+ with arrays of metallic particles* (poster), Nanolight, Benasque, Spain, March 11-17, 2012.

6. S.R.K. Rodriguez, O.T.A. Janssen, G. Lozano, A. Omari, Z. Hens, J. Gómez Rivas, *Diffractively Induced Transparency: Near Field Resonance at Far Field Anti-resonanc* (poster), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

7. S.R.K. Rodriguez, A. Abass, B. Maes, O.T.A. Janssen, G. Vecchi, J. Gómez Rivas, *Tunable Stop-gaps with Coupled Bright and Dark Plasmonic Lattice Resonances* (poster), MRS Spring Meeting, San Francisco, USA, April 9-12, 2012.

8. G. Lozano, G. Pirruccio, Y. Zhang, S.R.K. Rodriguez, R. Gomes, Z. Hens, J. Gómez Rivas, *Coherent absorption in thin layers of quantum dots* (poster), META'12, Paris,

France, April 19-22, 2012.

9. G. Grzela, Y. Fontana, E.P.A.M. Bakkers, J. Gómez Rivas, *Emission from 2D photonic crystals of InP nanowires mapped by Fourier microscopy* (poster), ESPS-NIS, Eindhoven, the Netherlands, May 7-9, 2012.

10. S.R.K. Rodriguez, A. Abass, B. Maes, O.T.A. Janssen, G. Vecchi, J. Gómez Rivas, *Tunable Stop-gaps with Coupled Bright and Dark Plasmonic Lattice Resonances* (poster), Gordon Conference on Plasmonics, Waterville, USA, June 10-15, 2012.

11. S.R.K. Rodriguez, O.T.A. Janssen, G. Lozano, A. Omari, Z. Hens, J. Gómez Rivas, *Near Field Resonance at Far Field Anti-resonance: Plasmonically Enhanced Light Emission with Minimum Scattering Nanoantennas* (poster), Gordon Conference on Plasmonics, Waterville, USA, June 10-15, 2012.

12. S.R.K. Rodriguez, G. Lozano, M.A. Verschuuren, R. Gomes, K. Lambert, B. de Geyter, A. Hassinen, D. Van Thourhout, Z. Hens, J. Gómez Rivas, *Coupling induced transparencies and extraordinary light emission* (poster), Metamaterials 2012, St. Petersburg, Russia, September 17-22, 2012.

13. S.R.K. Rodriguez, *Diffractively induced transparency and extraordinary light emission at the plasmon band edge* (poster), Metamaterials 2012, St. Petersburg, Russia, September 17-22, 2012.

14. G. Lozano, S.R.K. Rodriguez, M.A. Verschuuren, J. Gómez Rivas, *Plasmonic crystals for improving the performance of highly efficient sources* (poster), EOS Annual Meeting 2012, Aberdeen, UK, September 25-28, 2012.

15. G. Lozano, S.R.K. Rodriguez, M.A. Verschuuren, J. Gómez Rivas, *Plasmonic crystals for Solid-State Lighting* (poster), OSA Solid State and Organic Lighting, Eindhoven, the Netherlands, November 11-14, 2012.

16. G. Lozano, S.R.K. Rodriguez, M.A. Verschuuren, J. Gómez Rivas, *Plasmonic lattice resonances for improving the performance of solid-state lighting sources* (poster), MicroNano Conference, Ede, the Netherlands, December 10-11, 2012.

c. Awards and recognitions

1. Saïd Rahimzadeh-Kalaleh Rodriguez, First prize for the best student paper competition at Metamaterials 2012, St. Petersburg, Russia, September 17-22, 2012.

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. J. Gómez Rivas, Member, Scientific Advisory Board of the Spanish research program Nanolight.

2. J. Gómez Rivas, Co-organizer, Focus Session Use inspired fundamental physics in nano-optics, organic optoelectronics and electron sources (Physics@FOM 2012).

3. J. Gómez Rivas, Member, Scientific Advisory Board of the International Workshop on Optical Terahertz Science and Technology 2013 Conference to be held in April 2013 in Kyoto (Japan).

4. J. Gómez Rivas, Reviewer, Marsden Fund Council (New Zealand).

5. J. Gómez Rivas, Member, Thesis defense committee of A.J. Urbanczyk, Eindhoven University of Technology.

6. J. Gómez Rivas, Member, Thesis defense committee of G. Ramakrishnan, Delft University of Technology.

7. J. Gómez Rivas, Member, Thesis defense committee of S. Jahanmirinejad, Eindhoven University of Technology.

3. Knowledge transfer (societal and economic)

a. Patents

1. M.A. Verschuuren, S. Murai, S.R.K. Rodriguez, G. Lozano, D. Louwers, D. de Boer, J. Gómez Rivas, I. Marius, *Anisotropic enhanced emission from plasmonic coupled emitters for solid state lighting*, EU Patent Application (Patent pending).

2. S.L. Diedenhofen, D. de Boer, *Flexible Nanowire Based Solar Cell,* US Patent Application (Patent pending).

3. D. de Boer, S.R.K. Rodriguez, S.L. Diedenhofen, J. Gómez Rivas, *Luminescent solar concentrator with nanostructured luminescent layer*, EU Patent Application (Patent pending).

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. Philips Research (Photonics Materials and Devices group, H. van Sprang): Metamaterials for Solid-State Lighting.

2. Holst Center (M. Crego, S. Brongersma): Gas sensing.

c. Performances on television, radio or at public events

d. Publicaties in publieke tijdschriften, kranten of internet

e. Overige professionele producten (software, prototypes, etc.)

Outreach

1. Photovoltaics, 2 lectures in master course Advanced Materials and Energy Physics (AMEP), University of Amsterdam.

Group A.F. Koenderink 2012

Funding

FOM-Program Plasmonics (PLSM)
FOM-Program Nanoscale Quantum Optics (NQO)
FOM-Projectruimte (PR)
NanoNextNL program 6B Functional Nanophotonics (NN6B)
NanoNextNL program 6D Active Photonic Devices (NN6D)
NWO-VIDI (VIDI)

Employees

Felipe Bernal Arango (OIO)	VIDI
Martin Frimmer (OIO)	PLSM
Andrej Kwadrin (OIO)	PR
Lutz Langguth (OIO)	NN6D
Abbas Mohtashami (OIO)	VIDI
Clara Osorio (PD)	NN6B
Hinke Schokker (OIO)	NQO
Ivana Sersic (OIO)	Nanoned/AMOLF

1. Academic publications

a. Peer reviewed Publications

1. M. Frimmer, T. Coenen, A.F. Koenderink, *Signature of a Fano-resonance in a plasmonic molecule's local density of optical states*, Phys. Rev. Lett. **108**, 077404: 1-5 (2012).

2. I. Sersic, M.A. van de Haar, F. Bernal Arango, A.F. Koenderink, *Ubiquity of optical chirality in planar metamaterial scatterers*, Phys. Rev. Lett. **108**, 223903:1-5 (2012).

3. S. Murai, M.A. Verschuuren, G. Lozano, G. Piruccio, A.F. Koenderink, J. Gómez Rivas, *Enhanced absorption and emission of Y3Al5O12:Ce3+ thin layers prepared by epoxide-catalyzed sol-gel method*, Opt. Mater. Expr. **2**, 1111-1120 (2012).

4. A. Kwadrin, A.F. Koenderink, *Gray-tone lithography implementation of Drexhage's method for calibrating radiative and nonradiative decay constants of fluorophores*, J. Phys. Chem. C. **116**, 16666-16673 (2012).

5. F. Kelkensberg, A.F. Koenderink, M.J.J. Vrakking, *Attosecond streaking in nanoplasmonic fields*, New. J. Phys **14**, 093034:1-20 (2012).

6. F. Bernal Arango, A. Kwadrin, A.F. Koenderink, *Plasmonic Antennas Hybridized with Dielectric Waveguides*, ACS Nano **6**, 10156 (2012).

7. M. Frimmer, A.F. Koenderink, *Superemitters in Hybrid Photonic Systems: A Simple Lumping Rule for the Local Density of Optical States and its Break-Down at the Unitary Limit*, Phys. Rev. B **86**, 235428:1-6 (2012).

8. B. Husken, A.F. Koenderink, W.L. Vos, *Angular redistribution of near-infrared emission from quantum dots in 3D photonic crystals*, J. Phys. Chem C. online first. DOI: 10.1021/jp308590g.

9. N. Bonod, A. Bouhelier, A.F. Koenderink, A. Passian, *Optical antennas*, Int. J. Opt. **2012**, 365109 1-4 (2012).

b. Publications in proceedings or other journals

1. T. Coenen, M. Frimmer, A. Polman, A.F. Koenderink, *Antennes bepalen waarheen en hoe snel een foton uitgezonden wordt*, Nederlands Tijdschrift van Natuurkunde **78**, 62-66, 2012.

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. I. Sersic, *Magnetoelectric resonant metamaterial scatterers*, University of Amsterdam, September 11, 2012.

2. M. Frimmer, *Spontaneous emission near resonant optical antennas*, University of Amsterdam, November 14, 2012.

e. Open Access publications

1. M. Frimmer, T. Coenen, A.F. Koenderink, *Signature of a Fano-resonance in a plasmonic molecule's local density of optical states*, Phys. Rev. Lett. **108**, 077404: 1-5 (2012). [arXiv:1109.5407]

2. I. Sersic, M.A. van de Haar, F. Bernal Arango, A.F. Koenderink, *Ubiquity of optical chirality in planar metamaterial scatterers*, Phys. Rev. Lett. **108**, 223903:1-5 (2012). [arXiv:1201.2955]

3. S. Murai, M.A. Verschuuren, G. Lozano, G. Piruccio, A.F. Koenderink, J. Gómez Rivas, *Enhanced absorption and emission of Y3Al5O12:Ce3+ thin layers prepared by epoxide-catalyzed sol-gel method*, Opt. Mater. Expr. **2**, 1111-1120 (2012).

4. A. Kwadrin, A.F. Koenderink, *Gray-tone lithography implementation of Drexhage's method for calibrating radiative and nonradiative decay constants of fluorophores*, J. Phys. Chem. C. **116**, 16666-16673 (2012). [arXiv:1301.3338]

5. N. Bonod, A. Bouhelier, A.F. Koenderink, A. Passian, *Optical antennas (Editorial),* Int. J. Opt. **2012**, 365109:1-4 (2012).

6. F. Kelkensberg, A.F. Koenderink, M.J.J. Vrakking, *Attosecond streaking in nanoplasmonic fields*, New. J. Phys **14**, 093034:1-20 (2012).

7. M. Frimmer, A.F. Koenderink, *Superemitters in Hybrid Photonic Systems: A Simple Lumping Rule for the Local Density of Optical States and its Break-Down at the Unitary Limit*, Phys. Rev. B **86**, 235428:1-6 (2012). [arXiv:1204.1675]

8. A. Husken, A.F. Koenderink, W.L. Vos, *Angular redistribution of near-infrared emission from quantum dots in 3D photonic crystals*, J. Phys. Chem C. online first. DOI: 10.1021/jp308590g. [arXiv:0910.5749]

9. M. Frimmer, A. Mohtashami, A.F. Koenderink, *Nanomechanical method to gauge emission quantum yield applied to NV-centers in nanodiamond*. [arXiv:1212.5081]

10. A. Kwadrin, A.F. Koenderink, *Probing the electrodynamic local density of states with magneto-electric point scatterers*. [arXiv:1301.3704]

11. M. Frimmer, A.F. Koenderink, *Spontaneous Emission in a Dynamically Tunable Hybrid Photonic System*. [arXiv:1212.6396]

12. A. Mohtashami, A.F. Koenderink, *Suitability of nanodiamond NV centers for spontaneous emission control experiments*. [arXiv:1212.5172]

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. A.F. Koenderink, *Dark plasmon modes and bright emitters*, META'12, Paris, France, April 19-22, 2012.

2. A.F. Koenderink, *Electrodynamic point scattering models for plasmonics*, EUProMeta, Leuven, Belgium, May 7-11, 2012.

3. A.F. Koenderink, *Using dark and bright plasmon modes to realize brighter emitters*, 10th International Conference on Photonic and Electromagnetic Crystal Structures, Santa Fe, USA, June 4-8, 2012.

4. A.F. Koenderink, *Near-field measurement and manipulation of antenna-enhanced spontaneous emission*, NFO 2012, San Sebastian, Spain, September 3-7, 2012.

5. A.F. Koenderink, *Controlling electric, magnetic and magneto-electric dipole coupling in split ring clusters*, Metamaterials 2012, St. Petersburg, Russia, September 17-22, 2012.

6. A.F. Koenderink, *Dark, bright and optically active modes in magneto-plasmonic structures*, Frontiers in Optics 2012, Rochester, USA, October 14-18, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. I. Sersic, M.A. van de Haar, C. Tuambilangana, T. Kampfrath, A.F. Koenderink, *Optical chirality without geometrical chirality is ubiquitous in metamaterials* (talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. M. Frimmer, T. Coenen, A.F. Koenderink, *Signature of electromagnetically induced transparency in a plasmonic molecule's local density of optical states* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. A. Kwadrin, F. Bernal Arango, A.F. Koenderink, *Light Scattering by Plasmonic structures in Environments with Non-Trivial Local Density of States* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

4. A. Mohtashami, L. Langguth, A.F. Koenderink, *Single photon emitters in complex photonic environments* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

5. I. Sersic, M.A. van de Haar, C. Tuambilangana, A.F. Koenderink, *Polarizability of split ring resonators* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

6. A.F. Koenderink, *Metamaterials and magneto-electric point scatterers* (talk), Symposium, University of Twente, Enschede, the Netherlands, March 2, 2012.

7. A.F. Koenderink, *Nanoschaal antennes voor optica met enkele moleculen en enkele fotonen* (talk), KNAW&DJA Meeting, Amsterdam, the Netherlands, March 29, 2012.

8. M. Frimmer, T. Coenen, A.F. Koenderink, *Signature of a Fano Resonance in the Local Density of States of a Plasmonic Meta-Molecule* (talk), CLEO 2012, San Jose, USA, May 6-11, 2012.

9. A.F. Koenderink, *Subwavelength plasmonic and magnetic resonators to control photons and emitters* (talk), Optics & Photonics Seminar, Physikalisches Institut, Universitaet Bonn, Bonn, Germany, July 3, 2012.

10. O.L. Muskens, T. van der Beek, A.F. Koenderink, W.L. Vos, A. Lagendijk, *Broadband spectroscopy of static and dynamic light transport in nanomaterials* (poster), ETOPIM,

Marseille, France, September 2-7, 2012.

11. M. Frimmer, *Spontaneous emission near strongly scattering optical antennas* (talk), Quantum Optics Seminar, Niels Bohr Institute, Copenhagen, Denmark, September 13, 2012.

12. A.F. Koenderink, *Subwavelength plasmonic and magnetic resonators to control photons and emitters* (talk), Van der Waals Colloquium, Leiden Institute of Physics, Leiden, the Netherlands, September 14, 2012.

13. M. Frimmer, *Spontaneous emission near strongly scattering optical antennas* (talk), Photonics Seminar, ETH Zürich, Zürich, Germany, September 18, 2012.

14. A. Mohtashami, M. Frimmer, A.F. Koenderink, *Suitability of nanodiamond NV centers for spontaneous emission control experiments* (talk), NNV-AMO 2012, Lunteren, the Netherlands, October 9-10, 2012.

15. F. Bernal Arango, A.F. Koenderink, *Hybridized plasmonic antennas on dielectric waveguides* (poster), NNV-AMO 2012, Lunteren, the Netherlands, October 9-10, 2012.

16. M. Frimmer, A.F. Koenderink, *Hybrid photonic systems - superradiance at the unitary limit* (poster), NNV-AMO 2012, Lunteren, the Netherlands, October 9-10, 2012.

17. A. Kwadrin, A.F. Koenderink, *Gray-tone lithography implementation of Drexhage's method for calibrating radiative and nonradiative decay constants of fluorophores* (poster), NNV-AMO 2012, Lunteren, the Netherlands, October 9-10, 2012.

18. A.F. Koenderink, *Subwavelength plasmonic and magnetic resonators to control photons and emitters* (talk), Seminar, Leibniz Institute for Solid State and Materials Research, Dresden, Germany, December 14, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. A.F. Koenderink, Committee member, NWO Mozaiek 2012.

2. A.F. Koenderink, Board member, Section NNV-AMO, co-organizer of NNV-AMO Lunteren meeting.

3. A.F. Koenderink, Board member, Stichting Atelier van Licht.

4. A.F. Koenderink, Thesis committee Ymkje Huismans, May 2, 2012.

5. A.F. Koenderink, Committee member, Grant evaluation ´Wetenschapsknooppunten´.

6. A.F. Koenderink, Scientific team captain, Physics with Industry.

7. A.F. Koenderink, Member, DJA (Young Academy) of the KNAW.

8. A.F. Koenderink, Co-guest editor, Special on Optical Antennas Int. J. Optics.

3. Knowledge transfer (societal and economic)

a. Patents

1. R. Surdeanu, M. Buscema, C. Cox, A.F. Koenderink, *Method to detect the LED wavelength and flux output without external sensors,* European Patent Applications (Filed December 20, 2012).

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. Scientific Team Captain, FOM Workshop Physics with Industry, contact with Dr. Radu Surdeanu, NXP, Leuven, the Netherlands, November 2012.

2. A.F. Koenderink, Metamaterials and LDOS invited lectures in Nanophotonics lecture series at Philips Research, Eindhoven, the Netherlands, October 3, 2012.

3. A.F. Koenderink, Overview of numerical methods for LED emission, invited lecture in Nanophotonics lecture series at Philips Research, Eindhoven, the Netherlands, November 28, 2012.

4. Partnerships in NanoNextNL programs 6B and 6D (Philips Research, ASML, LioniX, Xio Photonics, PhoeniX).

c. Performances on television, radio or at public events

d. Publications in public magazines, newspapers or on the internet

1. A.F. Koenderink, *Het belang van licht en fotonische technologie voor de samenleving,* De Groene Amsterdammer [136], Special : Bèta-Wetenschapper (2012).

e. Other professional products (software, prototypes, etc.)

Outreach

1. Atelier van Licht: exposition at Stedelijk Museum for children (3-8 yrs old) with their parents, December 22-January 6. Approximately 4900 visitors.

Group H.J. Bakker 2012

Funding

FOM-Program Proton mobility in confinement (PMC)
FOM-Project Hydrophobes (PRH)
FOM-IPP Program Spectroscopie analysis of particles in water (IPPW)
FOM-IPP Program Understanding the visco-elasticity of elastomer-based nanocomposites
Water interacting with metals (MCWM)
Water interacting with proteins (CWE)
Anti-freeze proteins (CWA)
Molecular Thermometer (CWT)
NanoNextNL Program 5B Molecular Structure of Food (NN5B)

Employees

Ellen Backus (PD)	CWT
Wouter Ensing (stagiair)	-
Nuria Garcia (OIO)	MCM
Johannes Hunger (PD)	PMC
Liyuan Liu (OIO)	PMC
Stephan Lotze (OIO)	CWA
Niklas Ottosson (PD)	PMC
Marcin Pastorczak (PD)	CWE
Lukasz Piatkowski (OIO)	PMC
Sietse van der Post (OIO)	PRH
Yves Rezus (PD)	Missie
Stefan Scheidelaar (stagiair)	PRH
Simona Strazdaite (OIO)	IPPW

1. Academic publications

a. Peer reviewed Publications

1. H.J. Bakker, *Water's response to the fear of water*, Nature **491**, 533-535 (2012).

2. E.H.G. Backus, N. Garcia-Araez, M. Bonn, H.J. Bakker, *On the role of Fresnel factors in sum-frequency generation spectroscopy of metal-water and metal-oxide-water interfaces*, J. Phys. Chem. C **116**, 23351-23361 (2012).

3. J. Hunger, T. Sonnleitner, L. Liu, R. Buchner, M. Bonn, H.J. Bakker, *Hydrogen-bond dynamics in a protic ionic liquid : evidence of large-angle jumps*, J. Phys. Chem. Lett. **3**, 3034-3038 (2012).

4. T.H. van der Loop, M.R. Panman, S. Lotze, J. Zhang, T. Vad, H.J. Bakker, S. Woutersen, *Structure and dynamics of water in nonionic reverse micelles : A combined time-resolved infrared and small angle x-ray scattering study*, J. Chem. Phys. **137**, 044503 1-9 (2012).

5. J. Hunger, A. Bernecker, H.J. Bakker, M. Bonn, R.P. Richter, *Hydration dynamics of hyaluronan and dextran*, Biophys. J. **103**, L10-L12 (2012).

6. A. Mashaghi, P. Partovi-Azar, T. Jadidi, N. Nafari, K. Esfarjani, P. Maass, M.R.R. Tabar, H.J. Bakker, M. Bonn, *Interfacial water facilitates energy transfer by inducing extended vibrations in membrane lipids*, J. Phys. Chem. B **116**, 6455-6460 (2012).

7. L. Piatkowski, A.D. Wexler, E.C. Fuchs, H. Schoenmaker, H.J. Bakker, *Ultrafast vibrational energy relaxation of the water bridge*, Phys. Chem. Chem. Phys. **14**, 6160-6164 (2012).

8. J. Hunger, K.-J. Tielrooij, R. Buchner, M. Bonn, H.J. Bakker, *Complex formation in aqueous Trimethylamine-N-oxide (TMAO) solutions*, J. Phys. Chem. B **116**, 4783-4795 (2012).

9. L. Piatkowski, H.J. Bakker, *Vibrational relaxation pathways of amide I and amide II modes in N-methylacetamide*, J. Chem. Phys. **136**, 164504 1-8 (2012).

10. A. Mashaghi, P. Partovi-Azar, T. Jadidi, N. Nafari, P. Maass, M.R.R. Tabar, M. Bonn, H.J. Bakker, *Hydration strongly affects the molecular and electronic structure of membrane phospholipids*, J. Chem. Phys. **136**, 114709 1-5 (2012).

11. N. Garcia-Araez, P. Rodriguez, H.J. Bakker, M.T.M. Koper, *Effect of the surface structure of gold electrodes on the coadsorption of water and anions*, J. Phys. Chem. C **116**, 4786-4792 (2012).

12. M. Bonn, H.J. Bakker, Y. Tong, E.H.G. Backus, *No ice-like water at aqueous biological interfaces*, Biointerphases **7**, 20 1-5 (2012).

13. P.J. Harding, H.J. Bakker, A. Hartsuiker, J. Claudon, A.P. Mosk, J.-M. Gérard, W.L. Vos, *Observation of a stronger-than-adiabatic change of light trapped in an ultrafast switched GaAs-AlAs microcavity*, J. Opt. Soc. Am. B **29**, A1-A5 (2012).

14. A.A. Bakulin, S.D. Dimitrov, A. Rao, P.C.Y. Chow, C.B. Nielsen, B.C. Schroeder, I. McCulloch, H.J. Bakker, J.R. Durrant, R.H. Friend, *Charge-Transfer State Dynamics Following Hole and Electron Transfer in Organic Photovoltaic Devices*, J. Phys. Chem. Lett., **4,** 209 (2013).

15. S.D. Dimitrov, A.A. Bakulin, C.B. Nielsen, B.C. Schroeder, J. Du, H. Bronstein, I. McCulloch, R.H. Friend, J.R. Durrant, *On the Energetic Dependence of Charge Separation in Polymer/Fullerene Blends*, JACS, **134**, 18189 (2012).

16. Y. Vaynzof, A.A. Bakulin, S. Gelinas, R.H. Friend, *Direct Observation of Photoinduced Charge-Transfer States at Organic-Inorganic Interface*, Phys. Rev. Lett., **108**, 246605 (2012).

17. A.A. Bakulin, A. Rao, V. Paveleyev, P.H.M. van Loosdrecht, M.S. Pshenichnikov, D. Niedzialek, J. Cornil, D. Beljonne, R.H. Friend, *The Role of Driving Energy and Delocalised States for Charge Separation in Organic Semiconductors*, Science **335**, 1340 (2012).

18. S.T. van der Post, H.J. Bakker, *The Combined Effect of Cations and Anions on Water*, Phys. Chem. Chem. Phys. **14**, 6280-6288 (2012).

19. S.T. van der Post, S. Scheidelaar, H.J. Bakker, *Femtosecond study of the effects of ions on the reorientation dynamics of water*, Journal of Mol. Liq. **176**, 22-28 (2012).

20. S.T. van der Post, K.-J. Tielrooij, J. Hunger, E.H.G. Backus, H.J. Bakker, *Femtosecond Study of the Effects of Ions and Hydrophobes on the Dynamics of Water*, Faraday Discussions, DOI: 10.1039/C2FD20097J (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. L. Piatkowski, *Water interacting with interfaces, ions and itself*, University of Amsterdam, January 27, 2012.

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. A.A. Bakulin, *Ultrafast spectroscopy helping to design organic solar cells,* Zernike Seminar, Groningen, the Netherlands, February 20, 2012.

2. A.A. Bakulin, *Ultrafast pump-push photocurrent spectroscopy of organic semiconductors*, Ultrafast Phenomena 2012, Lausanne, Switzerland, June 9-16, 2012.

3. H.J. Bakker, *Femtosecond study of the effects of ions and hydrophobes on the dynamics of water*, Faraday Discussion 160: Ion Specific Hofmeister Effects, Oxford, UK, September 3-5, 2012.

4. H.J. Bakker, *Ultrafast dynamics and clustering of water and IR induced proton transfer at membrane surfaces*, MOLEC 2012, Oxford, UK, September 9-14, 2012.

5. A.A. Bakulin, *Watching optoelectronic devices at work*, Physics Colloquium, TU Graz, Austria, October 30, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. S.T. van der Post, J. Hunger, M. Bonn, H.J. Bakker, *The Effect of Cations on the Anionic Hydration Shell* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. S. Strazdaite, *Water Dynamics near Hydrophobic Membranes* (talk), FOM-WETSUS Meeting, Amsterdam, the Netherlands, March 20, 2012.

3. S. Strazdaite, S.J. Metz, H.J. Bakker, *Water Dynamics near Hydrophobic Membranes* (poster), Tulip Summer School V, Noordwijk, the Netherlands, April 10-13, 2012.

4. H.J. Bakker, *Femtosecond study of the dynamics of water near ions and hydrophobes* (talk), Physics Colloquium, Ruhr Universitaet Bochum, Bochum, Germany, April 26, 2012.

5. A.A. Bakulin, *Observation of Photoinduced Charge-Transfer States at Organic-Inorganic Interface* (talk), E-MRS Spring Meeting, Strasbourg, France, May 14-18, 2012.

6. H.J. Bakker, *Ultrafast Dynamics of Water near Ions and Hydrophobes* (talk), MESA + Nanofluidics Colloquium, University of Twente, Enschede, the Netherlands, May 22, 2012.

7. A.A. Bakulin, *Charge-transfer excitons in oganic-based optoelectronic devices* (talk), EXCON2012, Groningen, the Netherlands, July 2-6, 2012.

8. H.J. Bakker, *Location of water molecules in membranes probed with ultrafast vibrational Foerster energy transfer* (talk), Ultrafast Phenomena 2012, Lausanne, Switzerland, July 8-13, 2012.

9. L. Liu, *2D-IR Vibrational Spectroscopy of Proton Fluxional Defects in Aqueous Nanochannels* (poster), Ultrafast Phenomena 2012, Lausanne, Switzerland, July 8-13, 2012.

10. H.J. Bakker, *2D-IR Vibrational Spectroscopy of Proton Fluxional Defects in Aqueous Nanochannels* (talk), 6th International Conference on Coherent Multidimensional Spectroscopy, Berlin, Germany, July 16-18, 2012.

11. S. Strazdaite, S.J. Metz, H.J. Bakker, *Water Interacting with Hydrophobic Surfaces* (poster), Gordon Conference on Water and Aqueous Solutions, Holderness, USA, August 12-17, 2012.

12. S.T. van der Post, J. Hunger, M. Bonn, H.J. Bakker, *Hydration of Phospholipid Headgroups (*poster), Gordon Conference on Water and Aqueous Solutions, Holderness, USA, August 12-17, 2012.

13. A.A. Bakulin, *Pump-Push photocurrent spectroscopy of organic optoelectronic devices* (talk), Physics Colloquium, University of Potsdam, Potsdam, Germany, September 6, 2012.

14. A.A. Bakulin, *IR-control spectroscopy of organic optoelectronic devices* (talk), Bio-Physics Colloquium, Free University, Amsterdam, the Netherlands, September 10, 2012.

15. S. Strazdaite, *Water Interacting with Hydrophobic Interfaces* (talk), FOM-WETSUS Meeting, Delft University, Delft, the Netherlands, October 29, 2012.

16. H.J. Bakker, *Why ducks don't need a towel: dynamics of water near ions and hydrophobes* (talk), WETSUS Conference, Leeuwarden, the Netherlands, November 29, 2012.

c. Awards and recognitions

1. Simona Strazdaite, Runner-up PCCP poster prize for *Water Dynamics near Hydrophobic Membranes,* Tulip Summer School V, April 10-13, 2012.

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

c. Performances on television, radio or at public events

d. Publicaties in publieke tijdschriften, kranten of internet

1. De Volkskrant, artikel "*IJs, een kwestie van vriezen of dooien*", January 31, 2012.

2. RTV N-H, Radiointerview over ijs in TV programma Noord-Hollands Diep, February , 2012.

3. Radio 5, De Kettingvraag, February 8, 2012.

e. Other professional products (software, prototypes, etc.)

Outreach

1. Photovoltaics, 8 lecture hours in master course Advanced Materials and Energy Physics (AMEP), University of Amsterdam (2012).

Group M. Bonn 2012

Funding

FOM-Program Nanophotovoltaics (NPV)
FOM-Program Young Energy Scientists (YES)
FOM-Program Proton Mobility in Confinement (PMC)
FOM-Projectruimte Polyphenols (PP)
FOM-Projectruimte Water Surface Puzzle (PW)
NWO-VICI (VICI)
NWO-CW-ECHO (ECHO)
NanoNextNL Program 5B Molecular Structure of Food (NN5B)
Hot carrier solar cells (Toyota)
Nanobio Interfacing (Unilever)
MPIP-Scientific collaboration (MPIP)
DFG-German Science Foundation (DFG)
EU-Marie Curie-Air min wat (SFG)

Employees

Nils Billecke (PD)	NN5B
Kramer Campen	SFG
Enrique Canovas (PD)	Toyota
Katrin Domke	MPIP
Leonie Driessen (lab. assistant)	MPIP
Maarten Engel (PD)	PP
Cho-Shuen Hsieh (OIO)	PW
Johannes Hunger (PD)	DFG
Søren Jensen (OIO)	NPV
Sen Liang (gast)	MPIP
Gjenna Oshovsky (PD)	PP
Ruben Pool (OIO)	ECHO
Joep Pijpers (PD)	YES
Gianluca Rago (OIO)	MPIP
Maarten Soudijn (stagiair)	-
Yujin Tong (PD)	PMC
Ronald Ulbricht	MPIP
Jan Versluis	PR
Victor Volkov (PD)	MPIP
Zhen Zhang (PD)	VICI, MPIP

1. Academic publications

a. Peer reviewed Publications

1. R. Ulbricht, J.J.H. Pijpers, E. Groeneveld, R. Koole, C.D. Donega, D. Vanmaekelbergh, C. Delerue, G. Allan, M. Bonn, *Loosening Quantum Confinement: Observation of Real Conductivity Caused by Hole Polarons in Semiconductor Nanocrystals Smaller than the Bohr Radius,* Nano Letters **12** (9), 4937-4942 (2012).

2. R. Ulbricht, R. Kurstjens, M. Bonn, *Assessing Charge Carrier Trapping in Silicon Nanowires Using Picosecond Conductivity Measurements*, Nano Letters **12** (7), 3821-3827 (2012).

3. S.A. Jensen, J. Versluis, E. Canovas, J.J.H. Pijpers, I.R. Sellers, M. Bonn, *Carrier multiplication in bulk indium nitride*, Applied Physics Letters **101** (22), 222113 (2012).

4. A. Mashaghi, P. Partovi-Azar, T. Jadidi, N. Nafari, P. Maass, M.R.R. Tabar, M. Bonn, H.J. Bakker, *Hydration strongly affects the molecular and electronic structure of membrane phospholipids*, Journal of Chemical Physics **136** (11) (2012).

5. A. Mashaghi, P. Partovi-Azar, T. Jadidi, N. Nafari, K. Esfarjani, P. Maass, M.R.R. Tabar, H.J. Bakker, M. Bonn, *Interfacial Water Facilitates Energy Transfer by Inducing Extended Vibrations in Membrane Lipids*, Journal of Physical Chemistry B **116** (22), 6455-6460 (2012).

6. J. Hunger, K.-J. Tielrooij, R. Buchner, M. Bonn, H.J. Bakker, *Complex Formation in Aqueous Trimethylamine-N-oxide (TMAO) Solutions*, Journal of Physical Chemistry B **116** (16), 4783-4795 (2012).

7. J. Hunger, T. Sonnleitner, L.Y. Liu, R. Buchner, M. Bonn, H.J. Bakker, *Hydrogen-Bond Dynamics in a Protic Ionic Liquid: Evidence of Large-Angle Jumps*, Journal of Physical Chemistry Letters **3** (20), 3034-3038 (2012).

8. J. Hunger, A. Bernecker, H.J. Bakker, M. Bonn, R.P. Richter, *Hydration Dynamics of Hyaluronan and Dextran*, Biophysical Journal **103** (1), L10-L12 (2012).

9. B. Gjonaj, P. Johnson, M. Bonn, K.F. Domke, *Index mismatch aberration correction over long working distances using spatial light modulation*, Applied Optics **51** (33), 8034-8040 (2012).

10. M.F.M. Engel, C.C. van den Akker, M. Schleeger, K.P. Velikov, G.H. Koenderink, M. Bonn, *The Polyphenol EGCG Inhibits Amyloid Formation Less Efficiently at Phospholipid Interfaces than in Bulk Solution*, Journal of the American Chemical Society **134** (36), 14781-14788 (2012).

11. K.F. Domke, T.A. Riemer, G. Rago, A.N. Parvulescu, P.C.A. Bruijnincx, A. Enejder, B.M. Weckhuysen, M. Bonn, *Tracing Catalytic Conversion on Single Zeolite Crystals in 3D with Nonlinear Spectromicroscopy*, Journal of the American Chemical Society **134** (2), 1124–1129 (2012).

12. M. Bonn, H.J. Bakker, Y.J. Tong, E.H.G. Backus, *No Ice-Like Water at Aqueous Biological Interfaces*, Biointerphases **7** (1-4) (2012).

13. A. Berrier, P. Albella, M.A. Poyli, R. Ulbricht, M. Bonn, J. Aizpurua, J. Gómez Rivas, *Detection of deep-subwavelength dielectric layers at terahertz frequencies using semiconductor plasmonic resonators*, Optics Express **20** (5), 5052-5060 (2012).

14. E.H.G. Backus, N. Garcia-Araez, M. Bonn, H.J. Bakker, *On the Role of Fresnel Factors in Sum-Frequency Generation Spectroscopy of Metal-Water and Metal-Oxide-Water Interfaces*, Journal of Physical Chemistry C **116** (44), 23351-23361 (2012).

15. E.H.G. Backus, D. Bonn, S. Cantin, S. Roke, M. Bonn, *Laser-Heating-Induced Displacement of Surfactants on the Water Surface*, Journal of Physical Chemistry B **116** (9), 2703-2712 (2012).

16. S.T. van der Post, K.-J. Tielrooij, J. Hunger, E.H.G. Backus, H.J. Bakker, *Femtosecond Study of the Effects of Ions and Hydrophobes on the Dynamics of Water,* Faraday Discuss. DOI: 10.1039/C2FD20097J.

17. E.H.G. Backus, S. Abrakhi, S. Peralta, D. Teyssie, O. Fichet, S. Cantin, *Sum-frequency generation spectroscopy of cinnamate modified cellulosic polymer at the air-water interface,* J. Phys. Chem. B **116**, 6041 (2012).

18. D. Fuertes Marrón, E. Cánovas, I. Artacho, C.R. Stanley, M. Steer, T. Kaizu, Y. Shoji, N. Ahsan, Y. Okada, E. Barrigón, I. Rey-Stolle, C. Algora, A. Martí, A. Luque, *Application of Photoreflectance to Advanced Multilayer Structures for Photovoltaics*, Mat. Sci. and Eng. B, 10.1016/j.mseb.2012.11.012 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. R. Ulbricht, *Charge carriers in semiconductors : Loose, confined, trapped*, University of Amsterdam, June 29, 2012.

2. G. Rago, *Looking At Life Through Molecular Vibrations: Biomedical applications of CARS spectro-microscopy*, University of Amsterdam, October 18, 2012.

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. M. Bonn, *CARS for catalysis*, SPIE Multiphoton Microscopy in the Biomedical Sciences XII, San Francisco, USA, January 23-27, 2012.

2. M. Bonn, *Label-free measurements of biopolymers at model membranes*, PP'2012, Chengdu, China, June 4-8, 2012.

3. M. Bonn, *Structure and Dynamics of Interfacial Water*, Nonlinear Optics at Interfaces 2012, Telluride, USA, June 17-21, 2012.

4. M. Bonn, *Ultrafast dynamics of water at the water-air interface studied by femtosecond surface vibrational spectroscopy*, Ultrafast Phenomena 2012, Lausanne, Switzerland, July 8-13, 2012.

5. M. Bonn, *Label-free spectroscopy of lipids, proteins, and protein fibrils at model membranes,* 244th ACS National Meeting, Philadelphia, USA, August 19-23, 2012.

6. M. Bonn, *Ultrafast dynamics of the water interface studied by 2D femtosecond surface vibrational spectroscopy,* 244th ACS National Meeting, Philadelphia, USA, August 19-23, 2012.

7. M. Bonn, *Quantitative multiplex CARS microscopy,* 244th ACS National Meeting, Philadelphia, USA, August 19-23, 2012.

8. M. Bonn, *Vibrational response and dynamics of water at charged bio- and electrochemical interfaces*, 244th ACS National Meeting, Philadelphia, USA, August 19-23, 2012.

9. M. Bonn, *Structure and Dynamics of Interfacial Water*, 31st European Congress on Molecular Spectroscopy, Cluj-Napoca, Romania, August 26-31, 2012.

10. M. Bonn, *Structure and Dynamics of Interfacial Water Studied Using Femtosecond 2-Dimensional Surface Vibrational Spectroscopy*, 14th International Conference on Vibrations at Surfaces, Kobe, Japan, September 24-28, 2012.

11. M. Bonn, *Ultrafast THz spectroscopic studies of charge carrier multiplication*, International Symposium on Frontiers in THz Technology, Nara, Japan, November 26-30, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. J. Hunger, L. Liu, K.-J. Tielrooij, M. Bonn, H.J. Bakker, *Effect of Protons and Hydroxide Ions on the Dynamics of Water* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. E.H.G. Backus, *Vibrational spectroscopy of interfaces: Introduction to sum-frequency generation* (talk), IMPRS School: Characterization of polymer interfaces/surfaces/thin films, Wittenberg, Germany, April 23-27, 2012.

3. E.H.G. Backus, *Structure and Dynamics of Interfacial Water* (talk), 6th International Conference on Coherent Multidimensional Spectroscopy, Berlin, Germany, July 16-18, 2012.

4. S.A. Jensen, J. Versluis, E. Cánovas, J.J.H. Pijpers, I.R. Sellers, M. Bonn, *Carrier multiplication in bulk indium nitride* (talk), 27th European Photovoltaic Solar Energy Conference, Frankfurt, Germany, September 22-23, 2012.

5. E. Cánovas, C. de Mello Donegá, S. Kinge, M. Bonn, *Evaluation of hot electron transfer from PbSe quantum dots to mesoporous oxide films* (poster), 27th European Photovoltaic Solar Energy Conference, Frankfurt, Germany, September 22-23, 2012.

6. H. Wang, J.J.H. Pijpers, S. Kinge, M. Bonn, E. Cánovas, *Charge carrier dynamics at the QDs/oxide interface* (poster), 27th European Photovoltaic Solar Energy Conference, Frankfurt, Germany, September 22-23, 2012.

7. M. Bonn, *Structure and Dynamics of Interfacial Water* (talk), University of Minnesota, Minneapolis, USA, November 1, 2012.

8. M. Bonn, *Label-free Biomolecular Spectroscopy at Model Membranes* (talk), University of Geneva, Geneva, Switzerland, December 10, 2012.

9. M. Bonn, *Dynamics of Water around Protons and Ions* (talk), Institute of Chemical Sciences and Engineering ISIC, Lausanne, Switzerland, December 11, 2012.

10. M. Bonn, *Carrier Multiplication in Bulk and Quantum Dots: Relevance for photovoltaics* (talk), Institute of Chemical Sciences and Engineering ISIC, Lausanne, Switzerland, December 12, 2012.

11. M. Bonn, *Quantitative, Label-free Vibrational Microscopy for Catalysis* (talk), University of Bern, Bern, Switzerland, December 13, 2012.

12. M. Bonn, *Structure and Ultrafast Dynamics of Interfacial Water* (talk), University of Fribourg, Fribourg, Switzerland, December 14, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. M. Bonn, Co-chair, Gordon Research Conference on Vibrational Spectroscopy, University of New England, Biddeford, USA, August 5-10, 2012.

2. M. Bonn, Organizer, MicroCARS2012, Naurod, Germany, October 14-16, 2012.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

c. Performances on television, radio or at public events

d. Publications in public magazines, newspapers or on the internet

e. Other professional products (software, prototypes, etc.)

1. Quantum dot solar cell demonstrator.

Outreach

1. M. Bonn, Masterclass *How to get funded*, FOM, Utrecht, the Netherlands, May 11, 2012.
2. M. Bonn, Masterclass *How to get funded*, FOM, Utrecht, the Netherlands, October 19, 2012.

Group R.M.A. Heeren 2012

Funding
Shell
COMMIT
NPC
STW
COAST
EU-COST
J&J
INIBIC
NWO-Molhair
NIH-R01

Employees

Jim Appelmelk (gast)	-
Anne Bruinen (OIO)	STW
Berta Cillero Pastor (PD)	INIBIC/COMMIT
Kamila Chughtai (OIO)	NIH
Marc Duursma	-
Gert Eijkel	-
Shane Ellis (PD)	STW
Bryn Flinders (PD)	NWO-Molhair
Frans Giskes	-
Julia Jungmann (OIO)	-
Andras Kiss (OIO)	NPC
Nadine Mascini (OIO)	COMMIT
Don Smith (PD)	COMMIT

1. Academic publications

a. Peer reviewed Publications

1. L. Jiang, T.R. Greenwood, E.R. Amstalden van Hove, K. Chughtai, V. Raman, P.T. Winnard Jr., R.M.A. Heeren, D. Artemov, K. Glunde, *Combined MR, fluorescence and histology imaging strategy in a human breast tumor xenograft model*, NMR Biomed. epub ahead of print (2012).

2. L. Fornai, A. Angelini, I. Klinkert, F.G. Giskes, G.B. Eijkel, E.R. Amstalden van Hove, L.A. Klerk, M. Fedrigo, M. Valente, G. Thiene, R.M.A. Heeren, *Three dimensional molecular reconstruction of the heart with imaging mass spectrometry*, Anal. Bioanal. Chem. **404**, 2927-2938 (2012).

3. N.E. Mascini, R.M.A. Heeren, *Protein identification in mass-spectrometry imaging*, Trends Anal. Chem. **40**, 28–37 (2012).

4. B. Cillero Pastor, G.B. Eijkel, A. Kiss, F.J. Blanco Garcia, R.M.A. Heeren, *Time-of-flight secondary ion mass spectrometry-based maolcular distribution distinuishing healthy and osteoarthritic human cartilage*, Anal. Chem. **84**, 8909-8916 (2012).

5. D.F. Smith, A.V. Kharchenko, M. Konijnenburg, I. Klinkert, L. Paša-Tolić, R.M.A. Heeren, *Advanced mass calibration and visualization for FT-ICR Mass Spectrometry Imaging*, J. Am. Soc. Mass Spectrom. **23**, 1865 -1872 (2012).

6. J.H. Jungmann, D.F. Smith, L. MacAleese, I. Klinkert, J. Visser, R.M.A. Heeren, *Biological tissue imaging with a position and time sensitive pixelated detector*, J. Am. Soc. Mass Spetrom. **23**, 1679-1688 (2012).

7. L. Jiang, T.R. Greenwood, D. Artemov, V. Raman, P.T. Winnard Jr., R.M.A. Heeren, Z.M. Bhujwalla, K. Glunde, *Localized hypoxia results in spatially heterogeneous metabolic signatures in breast tumor models*, Neoplasia **14**, 732-741 (2012).

8. L.A. McDonnell, R.M.A. Heeren, P.E. Andrén, M. Stoeckli, G.L. Corthals, *Going forward: Increasing the accessibility of imaging mass spectrometry*, J. Proteomics **75**, 5113–5121 (2012).

9. T. Schramm, A. Hester, I. Klinkert, J.-P. Both, R.M.A. Heeren, A. Brunelle, O. Laprevote, M.-F. Robbe, M. Stoeckli, B. Spengler, A. Römpp, *imzML - a common data format for the flexible exchange and processing of mass spectrometry imaging data*, J. Proteomics **75**, 5106-5110 (2012).

10. J.H. Jungmann, R.M.A. Heeren, *Emerging technologies in mass spectrometry imaging*, J. Proteomics **75**, 5077-5092 (2012).

11. S. Chughtai, K. Chughtai, B. Cillero Pastor, A. Kiss, P. Agrawal, L. MacAleese, R.M.A. Heeren, *A multimodal mass spectrometry imaging approach for the study of musculoskeletal tissues*, Int. J. Mass Spectrom. **325-327**, 150-160 (2012).

12. F.E. Leach III, A.V. Kharchenko, G.N. Vladimirov, K. Aizikov, P.B. O'Connor, E.N. Nikolaev, R.M.A. Heeren, I.J. Amster, *Analysis of phase dependent frequency shifts in simulated FTMS transients using the filtered diagonalization method*, Int. J. Mass Spectrom. **325-327**, 19-24 (2012).

13. A.V. Kharchenko, G.N. Vladimirov, R.M.A. Heeren, E.N. Nikolaev, *Performance of orbitrap mass analyzer at various space charge and non-ideal field conditions: simulation approach*, J. Am. Soc. Mass Spectrom. **23**, 977-987 (2012).

14. K. Chughtai, L. Jiang, T.R. Greenwood, I. Klinkert, E.R. Amstalden van Hove, R.M.A. Heeren, K. Glunde, *Fiducial markers for combined 3-dimensional mass spectrometric and optical tissue imaging*, Anal. Chem. **84**, 1817−1823 (2012).

b. Publications in proceedings or other journals

1. A. Bodzon-Kulakowska, A. Kiss, K. Chughtai and R.M.A. Heeren, *Distribution of cholesterol in the brain tissue as an example of TOF-SIMS analysis*, 8th Münster Conference on Single Cell and Molecule Analysis Nov. 16-17, 2011: Proceedings/ed. S. König. New York: NOVA Publisher, 2012. - pp. 1-10 (Biomacromolecular Mass Spectrometry; 3).

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. K. Chughtai, *Multimodal imaging of hypoxia in breast cancer,* Utrecht University, November 5, 2012.

2. J.H. Jungmann, *Active pixel detectors for Mass Spectrometry Imaging*, Utrecht University, November 19, 2012.

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. R.M.A. Heeren, *High resolution squared: surface analysis of cells and tissue with imaging mass spectrometry*, Swiss Chemical Society Spring Meeting: 'New Developments in Analytical Chemistry', Geneva, Switzerland, February 16, 2012.

2. R.M.A. Heeren, *High resolution Imaging Mass Spectrometry: Ion and electrons at surfaces*, UPPCON 9, Charleston, USA, February 19-22, 2012.

3. R.M.A. Heeren, M.C. Duursma, D.F. Smith, L. Paša-Tolić, E.W. Robinson, *High Resolution Imaging Mass Spectrometry,* Pittcon 2012, Orlando, USA, March 11-15, 2012.

4. R.M.A. Heeren, *Molecular signaling studied with high resolution imaging MS,* Pittcon 2012, Orlando, USA, March 11-15, 2012.

5. R.M.A. Heeren, *Molecular Imaging of the Heart,* Frontiers in CardioVascular Biology 2012, London, UK, March 30–April 1, 2012.

6. R.M.A. Heeren, *Molecular signals on surfaces studied with high resolution imaging mass spectrometry*, 10th European FTMS Workshop, University of Warwick, Coventry, UK, April 1-5, 2012.

7. J. Driver, A. Kharchenko, R.M.A. Heeren, J. Amster, *Using Particle-In-Cell Simulations forImproving the Design of FTICR Analyzer Cells,* 10th European FTMS Workshop, University of Warwick, Coventry, UK, April 1-5, 2012.

8. D.F. Smith, E.W. Robinson, R.M.A. Heeren, L. Paša-Tolić, *C60 Secondary Ion FT-ICR MS for High Mass Accuracy and High Mass Resolving Power SIMS Imaging*, 10th European FTMS Workshop, University of Warwick, Coventry, UK, April 1-5, 2012.

9. R.M.A. Heeren, *Innovation in molecular imaging with mass spectrometry: running towards high resolution*, 2012 World Congress on Osteoarthritis, Barcelona, Spain, April 26-29, 2012.

10. R.M.A. Heeren, *Methods and strategies for Mass Spectrometric Imaging*, 6th MSBM Summer School, Dubrovnik, Croatia, July 8-14, 2012.

11. R.M.A. Heeren, *Studying Molecular Signals Of Diseases In Clinical Studies with Multimodal Molecular Imaging,* 6th MSBM Summer School, Dubrovnik, Croatia, July 8-14, 2012.

12. R.M.A. Heeren, *Breaking boundaries in imaging MS (invited),* 1st International Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

13. R.M.A. Heeren, *Image-n-omics: Innovation in Molecular Imaging with Mass Spectrometry,* World Molecular Imaging Congress 2012, Dublin, Ireland, September 5-8, 2012.

14. R.M.A. Heeren, *Imaging molecular signals with multimodal imaging mass spectrometry*, 19th International Mass Spectrometry Conference, Kyoto, Japan, September 15-21, 2012.

15. R.M.A. Heeren, *Multimodal molecular imaging with MS: from pretty pictures to tissue classification*, 9th EMSG Symposium, Ardgour House, Scotland, September 24-28, 2012.

16. D.F. Smith, L. Paša-Tolić, R.M.A. Heeren, *High Specificity Chemical Imaging by FT-ICR Mass Spectrometry,* 9th EMSG Symposium, Ardgour House, Scotland, September 24-28, 2012.

17. J.H. Jungmann, D.F. Smith, L. MacAleese, J. Visser, R.M.A. Heeren, *Active Pixel Detectors for Mass Spectrometry Imaging,* 9th EMSG Symposium, Ardgour House, Scotland, September 24-28, 2012.

18. R.M.A. Heeren, *Visualizing molecular signals of disease with High Resolution Mass Spectrometry,* Roche DIA Mass Spectrometry Symposium, Penzberg, Germany, October 18-19, 2012.

19. R.M.A. Heeren, *Multimodal molecular imaging of biological distributions at surfaces,* Waters Summit Meeting on Integrated Omics Research, Manchester, UK, October 29-31, 2012.

20. R.M.A. Heeren, *Images in the post genome era: Visualizing localized molecular pathways on tissue,* Postgenome 2012, Kazan, Russia, November 22-24, 2012.

21. R.M.A. Heeren, *The wondrous world of Imaging MS: A snapshot of the future,* Mass Spectrometry 80/60 Conference, Warwick University, Warwick, UK, December 10-11, 2012.

22. R.M.A. Heeren, *Multimodal molecular imaging of molecular signals in diseased tissue,* Annual Scientific Symposium of the UA-VITO Center for Proteomics, University of Antwerp, Antwerp, Belgium, December 20, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. J.H. Jungmann, L. MacAleese, J. Visser, J. Visschers, M.J.J. Vrakking, R.M.A. Heeren, *Space- and time-resolved imaging of bio-molecules using an in-vacuum pixel detector (*talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. N.E. Mascini, S. Chughtai, J. Wesseling, R.M.A. Heeren, *Multimodal Mass Spectrometry Imaging Methods in Breast Cancer Research* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. R.M.A. Heeren, *Imaging Mass Spectrometry: studying molecular signals at surfaces* (talk), TransACTS Symposium, Lunteren, the Netherlands, January 31, 2012.

4. K. Chughtai, *Exploring hypoxia-induced signaling networks in breast cancer (imaging),* (talk), NPC Annual Meeting, Utrecht University, Utrecht, the Netherlands, February 7, 2012.

5. B. Cillero Pastor, G.B. Eijkel, A. Kiss, F.J. Blanco García, R.M.A. Heeren, *Secondary ion mass spectrometry reveals a different composition and distribution of molecules in human normal and osteoarthritic cartilag*e (poster), NPC Annual Meeting, Utrecht University, Utrecht, the Netherlands, February 7, 2012.

6. R.M.A. Heeren, *Unraveling the biomolecular complexity of surfaces with imaging mass spectrometry* (talk), Nestlé Institute for Health Sciences, Lausanne, Switzerland, March 9, 2012.

7. R.M.A. Heeren, *Imagenomics: Interdisciplinary Integrative Imaging Mass Spectrometry* (talk), Michael Barber Centre for Mass Spectrometry, Manchester, UK, March 26, 2012.

8. B. Cillero Pastor, G.B. Eijkel, A. Kiss, F. Blanco, R.M.A. Heeren, *Maldi imaging mass spectrometry reveals a different protein distribution in human control and OA cartilage* (talk), 2012 World Congress on Osteoarthritis, Barcelona, Spain, April 26-29, 2012.

9. J.H. Jungmann, D.F. Smith, L. MacAleese, J. Visser, R.M.A. Heeren*, The Timepix Active Pixel Detector for Mass Spectrometry Imaging: Highly Parallel Space- and Time-Resolved Imaging of Bio-Molecules* (talk), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

10. B. Cillero Pastor, G.B. Eijkel, A. Kiss, F.J. Blanco, R.M.A. Heeren, *Secondary ion mass spectrometry reveals a different composition and distribution of molecules in human normal*

and osteoarthritic cartilage (poster), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

11. K. Chughtai, L. Jiang, T.R. Greenwood, K. Glunde, R.M.A. Heeren, *Mass Spectrometric Imaging of Lipidome in Breast Tumor Xenograft Models* (poster), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

12. D.F. Smith, I. Klinkert, M. Konijnenburg, L. Paša-Tolić, R.M.A. Heeren, *Sub-Parts-per-Million Mass Accuracy and mDa Visualization of FT-ICR Mass Spectrometry Imaging Data* (poster), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

13. A. Kiss, D.F. Smith, B. Reschke, G. Boyce, C. Walsh, M. Powell, R.M.A. Heeren, *Evaluation of a novel Laser Ablation Electrospray Ionization Source for the Imaging of Bacteria from High Salt Content Liquid Medium* (poster), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

14. R.F. Menger, A. Kiss, G.B. Eikel, D.S. Anbukumar, J.A. Bowden, D.A. Ford, R.M.A. Heeren, R.A. Yost, *MALDI and SIMS Imaging with Multivariate Data Analysis Applied to a Rat Coronary Artery Ligation Model* (poster), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

15. J. Driver, R.M.A. Heeren, A. Kharchenko, E. Nikolaev, J. Amster, *Performance of popular ICR cell geometries: a simulated expansion-based approach* (poster), 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, Canada, May 20-24, 2012.

16. R.M.A. Heeren, *Recent advances in imaging mass spectrometry* (talk), Seminar: Imaging Mass Spectrometry (IMS), a 'molecular microscope', University of Wageningen, Wageningen, the Netherlands, June 8, 2012.

17. N.E. Mascini, *MSI-based Molecular Histology towards automated molecular subtyping* (talk), 1st International Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

18. F. Marty, *Combining SIMS Imaging Mass Spectrometry and CARS Spectro-Microscopy to Reveal Patterns in Developmental Biology* (talk), 1st International Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

19. K. Chughtai, L. Jiang, T.R. Greenwood, K. Glunde, R.M.A. Heeren, *Mass Spectrometry Images the Lipidome of Breast Tumor Xenograft Tissue* (poster), 1st International Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

20. L. Fornai, A. Angelini, A. Kiss, G. Eijkel, K. Chughtai, M. Fedrigo, M.L. Valente, G. Thiene, R.M.A. Heeren, *A new image of the heart failure* (poster), 1st International

Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

21. N.E. Mascini, G.B. Eijkel, P. ter Brugge, J. Wesseling, R.M.A. Heeren, *Mass-Spectrometry Imaging of Tissue Microarrays to Access Breast Cancer Heterogeneity* (poster), 1st International Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

22. B. Cillero Pastor, G.B. Eijkel, A. Kiss, F.J. Blanco García, R.M.A. Heeren, *Different lipid and molecular composition of healthy and OA human cartilage revealed by imaging mass spectrometry* (poster), 1st International Conference on Imaging Mass Spectrometry, Ourense, Spain, September 3-5, 2012.

23. R.M.A. Heeren, *Unraveling molecular complexity at surfaces with imaging mass spectrometry* (talk), University of Amsterdam, Amsterdam, the Netherlands, September 13, 2012.

24. R.M.A. Heeren, *Unraveling molecular complexity on biological surfaces with imaging mass spectrometry* (talk), AIMMS seminar, Vrije Universiteit Amsterdam, Amsterdam, the Netherlands, October 22, 2012.

25. R.M.A. Heeren, *High resolution molecular imaging with mass spectrometry: Signals, pathways and disease* (talk), Institute for Physiological Chemistry, University Medical Center Mainz, Mainz, Germany, October 31, 2012.

c. Awards and recognitions

1. R.M.A. Heeren, EMSG Award 2012.

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. R.M.A. Heeren, Member, Editorial Board, IJMS.

2. R.M.A. Heeren, Member, Editorial Board, Journal of biomolecular mass spectrometry.

3. R.M.A. Heeren, Member, User proposal evaluation committee for PNNL-EMSL.

4. R.M.A. Heeren, Member, Scientific Advisory Board of the Warwick Center for Analytical Sciences.

5. R.M.A. Heeren, Member, Management Committee of the EU-COST Action BM1104.

6. R.M.A. Heeren, Member, Scientific Advisory Committee of the Ourense 2012 Conference on Imaging MS.

7. R.M.A. Heeren, Member, Scientific Advisory Board of the UPPCON 9 Conference.

8. R.M.A. Heeren, Member, International Scientific Committee, 19th international SIMS Meeting, Jeju, Korea.

9. R.M.A. Heeren, Member, SAB Protea Biosciences.

10. R.M.A. Heeren, Member, SAB ImaBioTech.

11. R.M.A. Heeren, Treasurer, International Mass Spectrometry Foundation.

12. R.M.A. Heeren, Co-founder, Omics2Image B.V..

3. Knowledge transfer (societal and economic)

a. Patents

1. P.E. Larson, J.S. Hammond, G.L. Fisher, R.M.A. Heeren, *Method and Apparatus to Provide Parallel Acquisition of Mass Spectrometry/Mass Spectrometry Data*, Physical Electronics; Provisional patent docket No. 334.00070160.

2. J.H. Jungmann, R.M.A. Heeren, D.-J. Spaanderman, *Electrical vacuum-compatible feed through structure and detector assembly using such feed through structure*, EP 18835.

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. NPC II / UU (Heck).

2. VUMC (van de Vies, Rozemuller).

3. TU Twente (Georgi).

4. EMC (van Beusekom).

5. DSM (Mengerink, Honing).

6. WUR (Nielen).

7. NKI (Wesseling).

8. Shell (Mul, Kuipers).

9. Pacific Northwest National Laboratory (Paša-Tolić).

10. ULVAC-Physical Electronics (Bryan, Fischer).

11. Waters (Hoyes).

12. University of Padova (A. Angelina, G.Thiene).

13. University of Zuerich (E. Brunner).

14. La Coruna University Hospital (Blanco-Garcia).
15. Johns Hopkins Medical School (Glunde).
16. University of Florida, Gainesville (Yost).
17. NSF-PIRE collaborations.
18. Janssen Pharmaceuticals (Cuyckens, Romijn).
19. University of Tuebingen (Sauter).

c. Performances on television, radio or at public events

d. Publicaties in publieke tijdschriften, kranten of internet

e. Other professional products (software, prototypes, etc.)

1. IonPix camera through Omics2Image B.V..

Outreach

1. R.M.A. Heeren, C2W article, 108 Vol. **16,** pp 17-19, September 22, 2012.

Group Y.L.A. Rezus 2012

Funding
Start-up AMOLF (Start-up)

Employees

Niels Commandeur (technicus)	-
Lianne van der Meer (stagiair)	-
Oleg Selig (OIO)	Start-up

1. Peer reviewed Publications

a. Publicaties in gerefereede tijdschriften

1. Y.L.A. Rezus, S.G. Walt, R. Letttow, A. Renn, G. Zumofen, S. Götzinger, V. Sandoghdar, *Single-photon spectroscopy of a single molecule*, Phys. Rev. Lett. **108**, 093601 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. Y.L.A. Rezus, *Catching biomolecules in action*, Theory seminar Groningen University, Groningen, the Netherlands, June 18, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects Nijmegen University (J. van Hest): Elastin-like peptides.

1. University of Amsterdam (J. Vreede), AMOLF (T. Shimizu): Dynamics of HAMP.

c. Performances on television, radio or at public events

1. Y.L.A. Rezus, Interview Hoe Zo!?, Radio 5, May 22, 2012.

d. Publications in public magazines, newspapers or on the internet

e. Other professional products (software, prototypes, etc.)

Outreach

1. Y.L.A. Rezus, Interview Trouw, *Helaas voor homeopathie is water zeer kort van memorie*, A. ten Broeke, July 16, 2012.

2. Y.L.A. Rezus, NWO case op www.nwo.nl, *Op heterdaad eiwit betrappen*.

3. Y.L.A. Rezus, Science and society workshop, AMOLF, September 26, 2012.

Group M. Leunissen 2012

Funding
FOM-Program Marginal Soft Matter (CMA)
FOM-Projectruimte (PR)
NWO-VIDI (VIDI)

Employees

Gesa Helms (PD)	PR
Bob Hommersom (OIO)	VIDI
Stef van der Meulen (OIO)	-
Arthur Newton (stagiair)	-

1. Academic publications

a. Peer reviewed Publications

1. T. Curk, A. de Hoogh, F.J. Martinez-Veracoechea, E. Eiser, D. Frenkel, J. Dobnikar, M.E. Leunissen, *Layering, freezing, and re-entrant melting of hard spheres in soft confinement*, Phys. Rev. **E 85**, 021502 1-5 (2012).

2. B.M. Mognetti, P. Varilly, S. Angioletti-Uberti, F.J. Martinez-Veracoechea, J. Dobnikar, M.E. Leunissen, D. Frenkel, *Predicting DNA-mediated colloidal pair interactions*, PNAS **109**, E378-E379 (2012).

3. B.M. Mognetti, M.E. Leunissen, D. Frenkel, *Controlling the temperature sensitivity of DNA-mediated colloidal interactions through competing linkages*, Soft Matter **8**, 2213-2221 (2012).

b. Publications in proceedings or other journals

1. M.E. Leunissen, *Zelfassemblerende materialen*, De Groene Amsterdammer **[136]**, Special: Bèta-Wetenschapper (2012).

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. M.E. Leunissen, *Blame Boltzmann: The important role of entropy in bio- & soft matter science,* International School 'Physical Chemistry of Biointerfaces', San Sebastian, Spain, July 10, 2012.

2. M.E. Leunissen, *Harnessing self-organization, self-replication and synthetic DNA in novel man-made materials*, International Conference of Physics Students, Utrecht, the Netherlands, August 6, 2012.

3. M.E. Leunissen, S.A.J. van der Meulen, B.M. Mognetti, D. Frenkel, *New strategies to improve the self-assembly properties of DNA-coated colloids*, 26th ECIS Conference, Malmo/Lund, Sweden, September 5, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. M.E. Leunissen, *Strong control through weak bonds: new strategies for specific recognition, self-organization and self-replication in man-made materials* (talk), University of Texas, Austin, , USA, February 22, 2012.

2. M.E. Leunissen, *Strong control through weak bonds: new strategies for specific recognition, self-organization and self-replication in man-made materials* (talk), NIST, Gaithersburg, USA, February 24, 2012.

3. M.E. Leunissen, B.M. Mognetti, D. Frenkel, *Making DNA competitive: a new strategy to improve the self-assembly properties of DNA-coated particles* (talk), APS March Meeting, Boston, USA, February 28, 2012.

4. M.E. Leunissen, *Breaking the boundary between biological and man-made materials: about self-organization, self-replication and smart DNA-glue* (talk), PAC Symposium, Leiden, the Netherlands, March 8, 2012.

5. M.E. Leunissen, *De sterke kanten van zwakke bindingen* (talk), DJA/KNAW Jaarbijeenkomst, Amsterdam, the Netherlands, March 29, 2012.

6. M.E. Leunissen, *Strong control through weak bonds: new strategies for specific recognition, self-organization and self-replication in man-made materials* (talk), Joan van der Waals Colloquium, Leiden, the Netherlands, April 13, 2012.

7. M.E. Leunissen, B.M. Mognetti, D. Frenkel, *New strategies to improve the self-assembly properties of DNA-coated colloids* (talk), IACIS, Sendai, Japan, May 13-18, 2012.

8. B. Hommersom, M.E. Leunissen, *From single bond experiments to collections of weak bonds* (poster), Soft Condensed Matter Summer School, Boulder, USA, July 3-13, 2012.

9. G. Helms, M. Aassim, M. Fernandez-Lahore, P.B. Kakarla, R.R. Vennapusa, M.E. Leunissen, J. Fritz, *Force measurements between functionalized beads and surfaces* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

10. M.E. Leunissen, *Strong control through weak bonds: new strategies to improve the self-assembly of micro- and nano-particles* (talk), Soft Matter Mini-Symposium, Weizman Institute, Rehovot, Israel, November 8, 2012.

c. Awards and recognitions

1. M.E. Leunissen, Benoemt als lid van 'De Jonge Akademie' van de KNAW, April 2012.

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. M.E. Leunissen, Member, Program Committee, Physics@FOM 2012.

2. M.E. Leunissen, Member, Beoordelingscommissie NWO-VENI Natuurkunde 2012.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

c. Performances on television, radio or at public events

1. NCRV Radio 1, De werk lunch, March 16, 2012.

2. *Slimme DNA-lijm*, Hoe?Zo! Radio, April 19, 2012.

3. *DNA is meer dan de blauwdruk van het leven: een bijzonder bouwmateriaal op nanoschaal* Kennis op Zondag, Den Haag, the Netherlands, October 7, 2012.

4. *What would happen if we could arrange the atoms one by one the way we want them?*, Avond van de Wetenschap & Maatschappij, Den Haag, the Netherlands, October 9, 2012.

d. Publications in public magazines, newspapers or on the internet

1. Interview with M.E. Leunissen, ESTA Magazine, August 2012.

2. *Dagboek van een Wetenschapper,* www.dejongeakademie.nl, December 4, 2012.

e. Other professional products (software, prototypes, etc.)

Outreach

1. M.E. Leunissen, *DNA als bouwmateriaal: zelf-vouwende origami en slimme lijm op nanoschaal* (talk), Landelijke DNA Lab Dag, Utrecht, the Netherlands, March 9, 2012.

2. M.E. Leunissen, S.A.J. van der Meulen, *DNA als slimme nano-lijm (demonstration)*, Bezoek van Vereniging van Wetenschapsjournalisten Nederland aan AMOLF, March 7, 2012.

3. M.E. Leunissen, Mede-oprichter van 'Kennis op Straat' van De Jonge Akademie, 2012.

Group M. Dogterom 2012

Funding
FOM-Program Spatial Design of Biochemical Regulation Networks (SPAT)
FOM-Program Mechanosensing and Mechanotransduction by Cells (MMC)
NWO-VICI (VICI)
NanoNextNL Program 8A Nanomolecular Machines in Cellular Force-Generation (NN8A)

Employees

Florian Huber (PD)	VICI
Liselotte Jauffred (gast PD)	VICI
Svenja-Marei Kalish (OIO)	VICI
Magdalena Preciado Lopez (OIO)	SPAT
Pierre Recouvreux (PD)	VICI
Sophie Roth (PD)	MMC
Nuria Taberner (OIO)	SPAT
Georges Weber (PD)	NN8A

1. Academic publications

a. Peer reviewed Publications

1. L. Laan, N. Pavin, J. Husson, G. Romet-Lemonne, M. van Duijn, M.P. Lopez, R. Vale, F. Julicher, S.L. Reck-Peterson, M. Dogterom, *Cortical dynein controls microtubule dynamics to generate pulling forces that postion microtubule asters*, Cell **148**, 502-514 (2012).

2. P. Recouvreux, M. Dogterom, *Dissecting spindle architecture with a laser*, Cell **149**, 507-509 (2012).

3. L. Laan, S. Roth, M. Dogterom, *End-on microtubule-dynein interactions and pulling-based positioning of microtubule organizing centers*, Cell Cycle **11,** 3750-3757 (2012).

4. M. Dogterom, T. Surrey, *Microtubule organization in vitro*, Curr. Opin. Cell Biol. online first (2012).

5. N. Pavin, L. Laan, R. Ma, M. Dogterom, F. Jülicher, *Positioning of microtubule organizing centers by cortical pushing and pulling forces*, New J. Phys. **14**, 105025 1-13 (2012).

b. Publications in proceedings or other journals

L. Laan, M. Dogterom, *Nanomachientjes organiseren het skelet van de cel*, Nederlands Tijdschrift van Natuurkunde **78**, 294-297 (2012).

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. M. Dogterom, *Reconstituting the principles of cytoskeletal organization,* India Bioscience Young Investigator Meeting, Lonavala, Maharashta, India, January 8-11, 2012.

2. M. Dogterom, *Mechanisms driving the organization of intra-cellular organelles*, ZCAM Workshop, Zaragoza, Spain, June 18-20, 2012.

3. M. Dogterom, Lorentz Workshop on Active Dynamics on *Microscales: Molecular Motors and Self Propelling Particles*, Leiden, the Netherlands, September 17-21, 2012.

4. M. Dogterom, Subgroup *Cytoskeletal Dynamics and Their Role in Cellular Form and Function*, ASCB Annual meeting, San Francisco, USA, December 15-19, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. S. Roth, *Toward Artificial Cell* (talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. S. Roth, J. Feng, J.V. van Schie, Y. Bollen, G. Koenderink, B. Mulder, M. Dogterom, *A biomimetic sytem to study the force transduction between an intracelullar cytoskeleton and an extracelullar matrix* (poster), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

3. S.-M. Kalisch, *Do forces affect EB-mediated MT regulation?* (talk), EMBO Conference Series, Heidelberg, Germany, May 23-26, 2012.

4. S. Roth, G. Koenderink, B. Mulder, M. Dogterom, *A biomimetic system to study the force transduction between an intracelullar cytoskeleton and an extracelullar matrix* (poster), EMBO Conference Series, Heidelberg, Germany, May 23-26, 2012.

5. P. Recouvreux, *Microtubule-based transport of polarity factors* (poster), EMBO Conference Series, Heidelberg, Germany, May 23-26, 2012.

6. N. Taberner, L. Laan, M. Dogterom, *Microtubules delivering proteins to walls* (poster), EMBO Conference Series, Heidelberg, Germany, May 23-26, 2012.

7. S.-M. Kalisch, *How do forces and end-binding proteins affect microtubule regulation?* (talk), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

8. N. Taberner, L. Laan, M. Dogterom, *Microtubules delivering proteins to walls* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

9. F. Huber, M. Preciado Lopez, S. Roth, G. Koenderink, M. Dogterom, *Active actin-microtubule crosstalk in reconstituted systems* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

10. M. Dogterom, *Deciphering microtubule-based positioning strategies in vitro* (talk), University of Pennsylvania, Philadelphia, USA, October 15, 2012.

11. P. Recouvreux, *Minimal microtubule-based system for the establishment of polarization in fission yeast* (poster), GDR Cell tyss, Grenoble, France, October 21-22, 2012.

12. M. Dogterom, *Deciphering microtubule-based positioning strategies in vitro* (talk), University of Warwick, Coventry, UK, November 13, 2012.

13. M. Dogterom, *Reconstituting essential cellular functionality in artificial systems* (talk), Nijmegen University, Nijmegen, the Netherlands, November 27, 2012.

14. M. Dogterom, *Positioning of microtubule organizing centers by pushing and pulling forces* (talk), NKI, Amsterdam, the Netherlands, December 7, 2012.

15. N. Taberner, *How can Microtubules establish protein patterns at the cell wall?* (talk), RIKEN Center for Developmental Biology, Kobe, Japan, December 7, 2012.

16. M. Dogterom, *Deciphering microtubule-based positioning strategies in vitro* (talk), Harvard University, Cambridge, USA, December 13, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. M. Dogterom, Member, Scientific Advisory Committee for the European School on Nanosciences and Nanotechnologies ESONN, Grenoble, France.

2. M. Dogterom, Member, Jury for Heinekenprijs of the KNAW.

3. M. Dogterom, Member, ´TWINS Raad´ of the KNAW (Dutch Academy of Sciences).

4. M. Dogterom, Member, FOM Werkgemeenschapscommissie ´Fysica van Leven´.

5. M. Dogterom, Member, Scientific Advisory Board, Goettingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences, Germany.

6. M. Dogterom, Member, Editorial Board, Cell.

7. M. Dogterom, Member, International Advisory Board, De Gennes Days on Physics of Cells - from Soft to Living Matter (PhysCell2012), Hyeres, France.

8. M. Dogterom, Member, Evaluation Committee, International Max Planck Research School for Chemical Biology, Dortmund, Germany.

9. M. Dogterom, Member, Problem selection committee, FOM Physics for Industry.

10. M. Dogterom, Member, Scientific Advisory Committee, Laboratoire d'Excellence, Institut Curie, Paris, France.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. S. Roth, Vrije Universiteit (Joen Luirink); Transmembrane protein.

2. M. Dogterom, Universiteit Utrecht (A. Akhmanova); Microtubules and end-tracking proteins.

3. M. Dogterom, Universiteit Wageningen (M. Janson); Microtubules in yeast.

4. M. Dogterom, NKI (P. Peters); Cryo-EM of molecular machines.

5. M. Dogterom, VU Amsterdam (Yves Bollen; Joen Luirink); Transmembrane proteins.

6. M. Dogterom, Harvard University, US (S. Reck-Peterson); dynein biochemistry.

7. M. Dogterom, 2012 MPI-PKS, Dresden, Germany (F. Juelicher); University of Zagreb, Croatia (N. Pavin); aster positioning due to pulling.

8. M. Dogterom, ETH Zurich, Switzerland (M. Steinmetz); microtubule end-binding protein biochemistry.

9. M. Dogterom, University of Zurich, Switzerland (D. Brunner); yeast cell biology.

10. M. Dogterom, University of Osnabruck, Germany (J. Piehler); surface functionalization.

11. M. Dogterom, MPI- MP, Dortmund, Germany (A. Musacchio); in vitro kinetochores.

12. M. Dogterom, FEI company via NNNL Program.

13. M. Dogterom, Nikon via NNNL Program.

c. Performances on television, radio or at public events

d. Publications in public magazines, newspapers or on the internet

1. M. Dogterom, *Cellen van glas en goud met spaken*, NRC, February 4, 2012.

2. M. Dogterom, *Celdeling betrapt in kunstmatige cel*, NWO hypothese, April, 2012.

3. M. Dogterom, *Making a flight simulator for the cell*, NanoTextNL, October, 2012.

e. Other professional products (software, prototypes, etc.)

Outreach

1. M. Dogterom, Contribution to LappTop program for high school girls, Physics Department Leiden University, Leiden, the Netherlands, February 2012.

2. M. Dogterom, Landelijke DNA-lab dag for Biology Teachers, Lecture, Utrecht, the Netherlands, March 9, 2012.

3. M. Dogterom, Reizende DNA-labs for high school students, Expert panel, Wageningen, the Netherlands, April 17, 2012.

4. M. Dogterom, Master course *Advanced Biophysics*, University of Leiden, Leiden, the Netherlands, Spring-Fall 2012.

Group S.J. Tans 2012

Funding

FOM-Program Physics of the Genome (DNAA)
FOM-Program Spatial Design of Biochemical Regulation Networks (SPAT)
FOM-Program Single Molecule Protein Aggregation (SMPA)
FOM-Projectruimte (PR)
NISB Glue Project (NISB)
NWO-VIDI (VIDI)
NWO-VICI (VICI)
ALW
NWO-complexity

Employees

Sergey Bezrukavnikov (OIO)	SMPA
Sarah Boulineau (OIO)	NISB
Alireza Mashaghi Tabari (OIO)	PR
Fatemeh Moayed (OIO)	personal funding
Philippe Nghe (PD)	DNAA
Vanda Sunderlikova	SPAT
Marjon de Vos (OIO)	VIDI
Noreen Walker (OIO)	SPAT

1. Academic publications

a. Peer reviewed Publications

1. A. Mashaghi, P. Partovi-Azar, T. Jadidi, N. Nafari, K. Esfarjani, P. Maass, M.R.R. Tabar, H.J. Bakker, M. Bonn, *Interfacial water facilitates energy transfer by inducing extended vibrations in membrane lipids*, J. Phys. Chem. B **116**, 6455-6460 (2012).

2. A. Mashaghi, P. Partovi-Azar, T. Jadidi, N. Nafari, P. Maass, M.R.R. Tabar, M. Bonn, H.J. Bakker, *Hydration strongly affects the molecular and electronic structure of membrane phospholipids*, J. Chem. Phys. **136**, 114709 1-5 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. M.G.J. de Vos, *Empirical adaptive landscapes in variable environments*, Delft University of Technology, January 31, 2012.

2. A. Mashaghi, *Single molecule investigations of Chaperone assisted protein folding*, Delft University of Technology, December 12, 2012.

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. S.J. Tans, P. Nge, M. Kogenaru, F. Poelwijk, M. de Vos, *Evolutionary constraint in variable environments*, Workshop Microbial systems biology, laboratory evolution and evolutionary theory, Free University, Amsterdam, the Netherlands, June 26, 2012.

2. M.G.J. de Vos, A. Dawid, S.J. Tans, *Crossing valleys in multipeaked adaptive landscapes,* The Sixth q-bio Conference, Santa Fe, USA, August 8-12, 2012.

3. S.J. Tans, P. Nge, M. Kogenaru, F. Poelwijk, M.G.J. de Vos, *Evolution of synthetic regulatory networks in variable environments,* 16th Evolutionary Biology Meeting at Marseille, France, September 18-21, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. S.J. Tans, P. Nge, M. Kogenaru, F. Poelwijk, M.G.J. de Vos, *Optimality and constraint in cellular decision making* (talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. M.G.J. de Vos, S.J. Tans, *Crossing adaptive landscapes in variable environments* (talk), Lab of Microbiology, Wageningen University, Wageningen, the Netherlands, January 2012.

3. S.J. Tans, P. Nge, M. Kogenaru, F. Poelwijk, M.G.J. de Vos, *Optimality and constraint in cellular decision making* (talk), TU Eindhoven, Eindhoven, the Netherlands, February 20-22, 2012.

4. M.G.J. de Vos, A. Dawid, S.J. Tans, *Crossing adaptive landscapes in variable environments* (talk), Bioinformatics and Systems Biology, Biocentrum, Basel, Switzerland, March 5, 2012.

5. M.G.J. de Vos, A. Dawid, S.J. Tans, *Crossing adaptive landscapes in variable environments* (talk), IST Austria, Klosterneuburg, Austria, March 14, 2012.

6. P. Nghe, *Evolutionary constraints from nework topology* (talk), UMR de Génétique Végétale, Orsay, France, March 31, 2012.

7. M.G.J. de Vos, A. Dawid, S.J. Tans, *Crossing valleys in multipeaked adaptive landscapes* (talk), MIT Department of Physics, Boston, USA, April 3, 2012.

8. M.G.J. de Vos, A. Dawid, S.J. Tans, *Crossing valleys in multipeaked adaptive landscapes* (talk), Evolutionary Systems Biology, Harvard, Boston, USA, April 5, 2012.

9. M.G.J. de Vos, A. Dawid, S.J. Tans, *Crossing valleys in multipeaked adaptive landscapes* (talk), Molecular and Cellular Biology, FAS Center Harvard, Boston, USA, April 10-13, 2012.

10. A. Mashaghi, G. Kramer, P. Bechtluft, B. Zachmann-Brand, A.J.M. Driessen, B. Bukau, S.J. Tans, *Reshaping of a protein folding landscape by the chaperone Trigger Factor* (poster), Molecular Chaperones & Stress Responses, Cold Spring Harbor Laboratory, Cold Spring Harbor, USA, May 1-5, 2012.

11. N. Walker, P. Nghe, S.J. Tans, *Cell cycle fluctuations in protein expression and growth rate* (talk), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

12. K.M. Taute, T.S. Shimizu, S.J. Tans, *An evolutionary view of chemotaxis* (poster), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

13. P. Nghe, M. Kogenaru, F. Poelwijk, S.J. Tans, *Pareto optimality in the evolution of gene regulatory networks* (poster), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

14. S. Boulineau, F. Tostevin, D.J. Kiviet, P.R. ten Wolde, P. Nghe, S.J. Tans, *Diauxic shift in single cells* (talk), NISB Symposium, Ijmuiden, the Netherlands, May 3-4, 2012.

15. S. Boulineau, F. Tostevin, D.J. Kiviet, P.R. ten Wolde, P. Nghe, S.J. Tans, *Single-cell dynamics reveals sustained growth during diauxic shift* (talk), KNAW Biophysics Meeting, Amsterdam, the Netherlands, May 29, 2012.

16. S.J. Tans, A. Mashaghi, G. Kramer, P. Bechtluft, B. Zachmann-Brand, A.J.M. Driessen, B. Bukau, *Reshaping of a protein folding landscape by the chaperone Trigger Factor* (talk), FYSICA-CHEMIE 2012, Enschede, the Netherlands, May 30, 2012.

17. K.M. Taute, T.S. Shimizu, S.J. Tans, *Why does E. coli have so many flagella?* (talk), VU-AMOLF Summer School, 't Vlintenholt, the Netherlands, June 24, 2012.

18. S. Bezrukavnikov, A. Mashaghi, S.J. Tans, *The effect of DnaK chaperone system on a protein folding pathway* (poster), Gordon Conference on Single Molecule Approaches to Biology, West Dover, USA, July 15-20, 2012.

19. N. Walker, P. Nghe, S.J. Tans. *Contribution of growth rate fluctuations to extrinsic noise* (poster), The Sixth q-bio Conference, Santa Fe, USA, August 8-12, 2012.

20. P. Nghe, D. Kiviet, S. Boulineau, S.J. Tans, *Noise in metabolic networks* (poster), The 13th International Conference on Systems Biology, Toronto, Canada, August 19-23, 2012.

21. S. Boulineau, F. Tostevin, D.J. Kiviet, P.R. ten Wolde, P. Nghe, S.J. Tans, *Single-cell dynamics reveals sustained growth during diauxic shift* (poster), The 13th International Conference on Systems Biology, Toronto, Canada, August 19-23, 2012.

22. S. Bezrukavnikov, S.J. Tans, *Single molecule force spectroscopy studies: protein folding* (talk), SMPA Meeting, FOM, Utrecht, the Netherlands, September, 2012.

23. S. Bezrukavnikov, *Chaperone-assisted protein folding: DnaKJE system* (talk), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

24. S. Boulineau, F. Tostevin, D.J. Kiviet, P.R. ten Wolde, P. Nghe, S.J. Tans, *Single-cell dynamics reveals sustained growth during diauxic shift* (talk), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

25. N. Walker, P. Nghe, S.J. Tans, *Correlation of growth rate fluctuations and gene expression noise* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

26. K.M. Taute, T.S. Shimizu, S.J. Tans, *An evolutionary view of chemotaxis* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

27. F. Moayed, A. Mashaghi, S.J. Tans, *A polypeptide-DNA hybrid with selective linking capability applied to single molecule nano-mechanical measurements using optical tweezers* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. S.J. Tans, Member, Evaluation committee, SPP 1617 Program Deutsche Forschungsgemeinschaft (DFG).

2. S.J. Tans, Member, Evaluation committee, FOM natuurkunde proefschrift prijs.

3. S.J. Tans, Member, Scientific Advisory Board Hubrecht Institute.

4. S.J. Tans, Member, Benoemings Advies Commissie Hubrecht Intitute.

5. S.J. Tans, Member, Benoemings Advies Commissie BioNanoSciences Department, Delft University of Technology.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. M.G.J. de Vos, Collaboration with BVB Subtrates- patent business.

c. Performances on television, radio or at public events

d. Publications in public magazines, newspapers or on the internetS.J. Tans, *Cees Dekker, Bionano-pionier*, Nederlands Tijdschrift voor Natuurkunde **78**.

1. M.G.J. de Vos, *Radio interview Hoe?Zo! Januari 2012.*

e. Other professional products (software, prototypes, etc.)

Outreach

1. S.J. Tans, College 'Cellular Dynamics', Delft University of Technology.

Group G.H. Koenderink 2012

Funding

FOM-Program Mechanosensing and Mechanotransduction by Cells (MMC)
FOM-Program Spatial Design of Biochemical Regulation Networks (SPAT)
FOM-Projectruimte (PR)
FOM-DPI-TIFN IPP Multi-scale structure and mechanics of collagenous materials (BRM)
FOM-DPI-TIFN IPP Molecular control over amyloid protein fibril formation by polyphenols (BRM)
FOM/Profibrix MiniIPP (Profibrix)
Human Frontiers Young Investigator grant (HF)
NWO-VIDI (VIDI)
Van Gogh programme Frans/Nederlandse Akademie (Van Gogh)
NanoNextNL Program 5B Molecular Structure of Food (NN5B)
Marie Curie IntraEuropean Fellowship
European Synchrotron Radiation Facility (ESRF)

Employees

Baldo Alonso Latorre (PD)	PR/Marie Curie
Jose Alvarado (OIO)	VIDI
Suzanne Detiger (gast)	-
Corianne Gelderloos (OIO)	BRM
Brian Gentry (PD)	HF
Alexandra Grigore (stagiair)	-
Karin Jansen (OIO)	MMC
Hendry Kristyanto (stagiair)	-
Nicholas Kurniawan (PD)	HF
Jeanette Nguyen (OIO)	NN5B
Izabela Piechocka (PD)	Profibrix
Magdalena Preciado Lopez (OIO)	SPAT
Andre Scholich (stagiair)	-
Bjorn Stuhrmann (PD)	HF /PR
Feng-Ching Tsai (OIO)	VIDI
Martijn de Wild (OIO)	BRM

1. Academic publications

a. Peer reviewed Publications

1. S.E.L. Detiger, R.J.W. Hoogendoorn, A.J. van der Veen, B.J. van Royen, M.N. Helder, G.H. Koenderink, T.H. Smit, *Biomechanical and rheological characterisation of mild intervertebral disc degeneration in a large animal model*, J. Orthop. Res. **online first**, (2012).

2. B. Gentry, S. van der Meulen, P. Noguera, B. Alonso-Latorre, J. Plastino, G.H. Koenderink, *Multiple actin binding domains of Ena/VASP proteins determine actin network stiffening*, Eur. Biophys. J. **41**, 979-990 (2012).

3. M.F.M. Engel, C.C. van den Akker, M. Schleeger, K.P. Velikov, G.H. Koenderink, M. Bonn, *The polyphenol EGCG inhibits amyloid formation less efficiently at phospholipid interfaces than in bulk solution*, J. Am. Chem. Soc. **134**, 14781−14788 (2012).

4. B. Stuhrmann, M. Soares e Silva, M. Depken, F.C. MacKintosh, G.H. Koenderink, *Nonequilibrium fluctuations of a remodeling in vitro cytoskeleton*, Phys. Rev. E **86**, 020901(R) 1-5 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

1. I. Piechocka, K.A. Jansen, C.P. Broedersz, F.C. MacKintosh, G.H. Koenderink, *Semiflexible bundle model explains the elasticity of fibrin networks* [arXiv:1206.3894].

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. G.H. Koenderink, *Motor-driven patterning of the actin cytoskeleton*, Aspen Winter Conference on Growth and Form: Pattern Formation in Biology, Aspen, USA, January 2-7, 2012.

2. G.H. Koenderink, *A soft matter perspective on the living cell*, SoftComp Annual Meeting 2012, Heraklion, Greece, May 28-June 1, 2012.

3. G.H. Koenderink, *Reconstitution of biomimetic cellular systems*, EMBO Practical Course 'Microscopy, Modeling and Biophysical Methods', EMBL Heidelberg, Heidelberg, Germany, September 7, 2012.

4. G.H. Koenderink, *Physics of cytoskeletal organization*, Annual Meeting of the German Biophysical Society, Göttingen, Germany, September 23-26, 2012.

5. G.H. Koenderink, *Myosin motor control over the cytoskeleton & Mechanics of hierarchical biopolymer networks*, Graduate School BuildMoNa, Leipzig University, Leipzig, Germany, September 29, 2012.

6. G.H. Koenderink, *Rheology of hierarchical biopolymer networks*, Dutch-Belgian Rheology Day, Rotterdam, the Netherlands, October 18, 2012.

7. G.H. Koenderink, *Cytoskeleton-mediated remodeling of the cell membrane*, IB Conference on Biomembranes 2012, Utrecht, the Netherlands, October 25-26, 2012.

8. G.H. Koenderink, *Membrane/cytoskeleton crosstalk*, 3rd Physics of Cancer Symposium, Leipzig, Germany, November 1-3, 2012.

9. G.H. Koenderink, *Polypeptides: from molecular structure to mechanical properties*, MPI Polymer Research Symposium, Mainz, Germany, November 15-16, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. C.C. van den Akker, M.F.M. Engel, K. Velikov, M. Bonn, G.H. Koenderink, *Morphology and persistence length of amyloid fibrils are correlated to peptide molecular structure* (talk), Physics@FOM 2012, Veldhoven, the Netherlands, January 17-18, 2012.

2. J. Alvarado, F.-C. Tsai, A. Bertin, M. Mavrakis, G.H. Koenderink, *Peanut: a biophysical study of septin-mediated regulation of the actin-myosin cytoskeleton* (talk), Van Gogh Awards Ceremony, Institut Français, Amsterdam, the Netherlands, January 25, 2012.

3. K.A. Jansen, G.H. Koenderink, *Stiffening of Fibrin Gels under the Influence of Traction Forces by Fibroblasts* (talk), EU-COST Intermediate Filament WG3 Meeting, Göttingen, Germany, February 20, 2012.

4. G.H. Koenderink, *Physics of cytoskeletal organization* (talk), Laboratory of Physical Chemistry and Colloid Science, Wageningen University, Wageningen, the Netherlands, March 2, 2012.

5. G.H. Koenderink, *Motor-driven organization of the actin cytoskeleton* (talk), MPI-CBG and MPI-PKS, Dresden, Germany, March 5, 2012.

6. G.H. Koenderink, *Motor-driven organization of the actin cytoskeleton* (talk), Institut Charles Sadron, Strasbourg, France, April 2, 2012.

7. C.C. van den Akker, M.F.M. Engel, K. Velikov, M. Bonn, G.H. Koenderink, *Characterization of beta-lactoglobulin and hen egg white lysozyme over different length scales* (talk), International Symposium on Food Rheology and Structure, Zurich, Switzerland, April 11, 2012.

8. J. Alvarado, M. Sheinman, A. Sharma, F.C. MacKintosh, G.H. Koenderink, *Molecular motors drive active gels to a critically connected state* (talk), 12th Dutch Soft Matter Meeting, University of Amsterdam, Amsterdam, the Netherlands, April 27, 2012.

9. J. Alvarado, M. Sheinman, A. Sharma, F.C. MacKintosh, G.H. Koenderink, *Molecular motors drive active gels to a critically connected state* (talk), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

10. M. Preciado López, M. Steinmetz, A. Akhmanova, M. Dogterom, G.H. Koenderink, *Dynamic crosstalk between actin and microtubules in vitro* (talk), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

11. B. Stuhrmann, M. Soares e Silva, G.H. Koenderink, *Nonequilibrium Fluctuations of a Remodeling In Vitro Cytoskeleton* (talk), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

12. F.-C. Tsai, B. Stuhrmann, G.H. Koenderink, *Self-organized active actomyosin networks inside giant vesicles* (poster), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

13. B. Alonso Latorre, G.H. Koenderink, *Biomimetic model of the cell cytoskeleton: polymer networks cross-linked with DNA strands* (poster), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

14. C.C. van den Akker, M.F.M. Engel, M. Schleeger, K.P. Velikov, M. Bonn, G.H. Koenderink, *Linking the peptide molecular structure of amyloid fibers to their mechanical properties* (poster), XIII International Symposium on Amyloidosis, Groningen, the Netherlands, May 7, 2012.

15. G.H. Koenderink, *Multiscale mechanics of protein biopolymers* (talk), Bio(related) Materials Day 2012, Utrecht, the Netherlands, May 10, 2012.

16. C.C. van den Akker, M.F.M. Engel, M. Schleeger, K.P. Velikov, M. Bonn, G.H. Koenderink, *Linking the peptide molecular structure of amyloid fibers to their mechanical properties* (poster), Bio(related) Materials Day 2012, Utrecht, the Netherlands, May 10, 2012.

17. G.H. Koenderink, *Physics of cell architecture and mechanics* (talk), Institute for Theoretical Physics Amsterdam, University of Amsterdam, Amsterdam, the Netherlands, May 12, 2012.

18. J. Nguyen, G.H. Koenderink, I. Cohen, *Liquid Crystalline phase behavior of Lysozyme amyloid nanofibrils* (poster), Frontiers of Soft Matter 2012, University of Colorado, Boulder, USA, May 16-18, 2012.

19. M. Preciado López, M. Steinmetz, A. Akhmanova, M. Dogterom, G.H. Koenderink, *Dynamic crosstalk between actin and microtubules in vitro* (poster), EMBO Conference Series, Heidelberg, Germany, May 23-26, 2012.

20. J. Alvarado, M. Sheinman, A. Sharma, F.C. MacKintosh, G.H. Koenderink, *Molecular motors drive active gels to a critically connected state* (poster), Active Jammed Systems Conference, New York University, New York, USA, May 26-28, 2012.

21. M. Preciado López, M. Steinmetz, A. Akhmanova, M. Dogterom, G.H. Koenderink, *Dynamic crosstalk between actin and microtubules in vitro* (talk), Physiology: Modern Cell Biology Using Microscopic, Biochemical and Computational Approaches, Marine Biological Laboratory, Woods Hole, USA, June 9–July 29, 2012.

22. J. Alvarado, M. Sheinman, A. Sharma, F.C. MacKintosh, G.H. Koenderink, *Molecular motors drive active gels to a critically connected state* (talk), VU–AMOLF Summer School, 't Vlintenholt, the Netherlands, June 24, 2012.

23. F.-C. Tsai, B. Stuhrmann, G.H. Koenderink, *Physical basis of actin based membrane protrusions* (talk), VU–AMOLF Summer School, 't Vlintenholt, the Netherlands, June 24, 2012.

24. K.A. Jansen, I.K. Piechocka, R.G. Bacabac, E.H.J. Danen, G.H. Koenderink, *Stiffening of Fibrin Gels under the Influence of Traction Forces by Fibroblasts* (poster), 21st International Congress on Fibrinolysis & Proteolysis, Brighton, UK, July 1-5, 2012.

25. B. Alonso Latorre, G.H. Koenderink, *Protein biopolymers: Nature's designer soft materials* (talk), 8th European Solid Mechanics Conference, Graz, Austria, July 9-13, 2012.

26. B. Alonso Latorre, I.K. Piechocka, G.H. Koenderink, *Fingerprinting the non-linear rheology of fibrin clots using LAOS* (poster), XVIth International Congress on Rheology, Lisbon, Portugal, August 5-10, 2012.

27. N.A. Kurniawan, G.H. Koenderink, *A realistic 3D model to study nonlinear mechanics of cross-linked semiflexible polymer networks* (poster), International Meeting of the German Society for Cell Biology, Regensburg, Germany, September 12–15, 2012.

28. F.-C. Tsai, B. Stuhrmann, G.H. Koenderink, *Morphologies of liposomes encapsulating actin bundles* (poster), Biomembrane Days, Potsdam, Germany, September 19-21, 2012.

29. M. Preciado López, M. Steinmetz, A. Akhmanova, M. Dogterom, G.H. Koenderink, *Dynamic crosstalk between actin and microtubules in vitro* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

30. B. Stuhrmann, M. Soares e Silva, G.H. Koenderink, *Nonequilibrium Fluctuations of a Remodeling In Vitro Cytoskeleton* (talk), NECD12, Potsdam, Germany, October 1-4, 2012.

31. F.-C. Tsai, B. Stuhrmann, G.H. Koenderink, *Morphologies of liposomes encapsulating actin bundles* (talk), 27th European Cytoskeleton Forum Meeting, Pecz, Hungary, November 3-7, 2012.

32. K.A. Jansen, I.K. Piechocka, B. Alonso Latorre, G.H. Koenderink, *Deciphering the origins of nonlinear strain-stiffening of fibrin using SAXS* (talk), Soft Matter Meeting, Amsterdam, the Netherlands, November 8, 2012.

33. C.C. van den Akker, M. Schleeger, M. Bonn, G.H. Koenderink, *Unraveling the link between peptide molecular structure and morphology of amyloid fibrils* (talk), KNAW Biophysics Meeting, Amsterdam, the Netherlands, November 29, 2012.

34. J. Nguyen, G.H. Koenderink, I. Cohen, *title unknown* (talk), 13th New York Complex Matter Workshop, Syracuse University, New York, USA, December 14, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. G.H. Koenderink, Organizer, 12th Dutch Soft Matter Meeting, University of Amsterdam, Amsterdam, the Netherlands, April 27, 2012.

2. G.H. Koenderink, Co-Chair of Program Committee, Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

3. G.H. Koenderink, Member, Management Committee of NANONET – *Nanomechanics of intermediate filament networks*, COST.

4. G.H. Koenderink, Member, Jury for the *Heineken Young Investigator Award* of the KNAW, Area of Biochemistry and Biophysics.

5. G.H. Koenderink, Member, Jury for the *Heineken Prize* of the KNAW, Area of Biochemistry and Biophysics.

6. G.H. Koenderink, Member, Grant Review Committee, CW-ECHO, NOW, the Netherlands.

7. G.H. Koenderink, Member, Editorial Board, Biophysical Journal.

8. G.H. Koenderink, Member, Editorial Board, European Physical E Journal.

9. G.H. Koenderink, Member, DJA.

10. G.H. Koenderink, Member, PhD Thesis Committee J.W.M. Beenakker, Leiden University, June 5, 2012.

11. G.H. Koenderink, Member, PhD Thesis Committee H. Amuasi, Eindhoven University of Technology, May 1, 2012.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. C.C. van den Akker, *Molecular control over amyloid formation by polyphenols,* Presentation for BRM Users Committee, May 10, 2012.

2. G.H. Koenderink, *Molecular control over protein assembly by polyphenols*, NanoNextNL Meeting, March 23, 2012.

3. G.H. Koenderink, *Molecular control over protein assembly by polyphenols*, NanoNextNL Meeting, September 21, 2012.

4. G.H. Koenderink, *Measuring cell traction forces in 3D*, NanoNextNL Meeting, November 30, 2012.

5. G.H. Koenderink, *Physics of biological soft matter*, AMOLF Industrial Affiliates Day, November 15, 2012.

c. Performances on television, radio or at public events

1. N. Kurniawan: *Perlombaan Merebut Saintis Muda*, Deutsche Welle, July 6, 2012.

2. J. Alvarado, Presenter, Film & Science Festival, NEMO Science Center, Amsterdam, the Netherlands, April 12, 2012.

d. Publications in public magazines, newspapers or on the internet

1. *Waarom Alzheimer medicatie niet werkt, Onderzoekers misleid door gebrek aan celmembranen in reageerbuisjes*, Highlight op C2W website: http://www.c2w.nl/waarom-alzheimermedicatie-niet-werkt.282794.lynkx

2. *The skeleton dance*, American Physical Society (APS) highlight Augustus 27, 2012, http://physics.aps.org/synopsis-for/10.1103/PhysRevE.86.020901

e. Other professional products (software, prototypes, etc.)

Outreach

1. C. Gelderloos, tour leader & discussion with political party PVDA (Tanja Jadnanansing), FOM Institute AMOLF, Amsterdam, the Netherlands, February 6, 2012.

2. G.H. Koenderink, DJA on Wheels, Campus Winschoten (VMBO), March 30, 2012.

3. G.H. Koenderink, *Interdisciplinary research*, Presentation to the Students in the Honors Program at Nijmegen University, Radboud Universiteit Nijmegen, the Netherlands, April 6, 2012.

4. B. Alonso Latorre, *Connectivity transmits myosin pulling-forces over long distances*, Presentation to the Students in the Honors Program at Nijmegen University, Radboud Universiteit Nijmegen, the Netherlands, April 6, 2012.

5. G.H. Koenderink, *Biophysical properties of amyloid fibrils*, ONWAR course on neurodegeneration, Graduate School Neurosciences Amsterdam Rotterdam (ONWAR), NIN, Amsterdam, the Netherlands, May 8, 2012.

6. B. Alonso Latorre, *Myosin pulling-forces are transmitted over long distances*, Presentation to the Students of the Biophysics Program at Leiden University, FOM Institute AMOLF, Amsterdam, the Netherlands, May 16, 2012.

7. C. Gelderloos, tour leader & discussion with political party CDA (Maarten Haverkamp), FOM Institute AMOLF, Amsterdam, the Netherlands, June 7, 2012.

8. C. Gelderloos, tour leader & discussion with Maxime Verhagen Minister of Economic Affairs, FOM Institute AMOLF, Amsterdam, the Netherlands, September 6, 2012.

9. N. Kurniawan, Demonstrator & Tour Leader, AMOLF Open Day, October 4, 2012.

10. J. Alvarado, Contributor, "Steps of Organized Knowledge" public art installation, Science Park, Amsterdam, the Netherlands, December 20, 2012.

11. G.H. Koenderink, *MSc. course Soft Condensed Matter and Biological Physics*, VU University/University of Amsterdam, the Netherlands, December 2012.

Group B.M. Mulder 2012

Funding

FOM-Program Spatial Design of Biochemical Regulation Networks (SPAT)
NCSB-CBSG Program Systems Biology (NCSB)

Employees

Eva Deinum (OIO)	NCSB
Takis Foteinopoulos (OIO extern)	-
Ioana Garlea (OIO)	SPAT
Pieter Mulder (stagiair)	-
Leander Schuitman (stagiair)	-
Xuyi Wang (stagiair)	-

1. Academic publications

a. Peer reviewed Publications

1. B.M. Mulder, *Microtubules interacting with a boundary: mean length and mean first-passage times,* Phys. Rev. E **86**, 011902 1-11 (2012).

2. D. Chaudhuri, B.M. Mulder, *Spontaneous helicity of a polymer with side-loops confined to a cylinder*, Phys. Rev. Lett. **108**, 268305 1-5 (2012).

3. E.E. Deinum, R. Geurts, T. Bisseling, B.M. Mulder, *Modeling a cortical auxin maximum for nodulation : different signatures of potential strategies,* Frontiers Plant Biophys. Model. **3**, 96 1-19 (2012).

4. P. Dhonukshe, D.A. Weits, A. Cruz-Ramirez, E.E. Deinum, S.H. Tindemans, K. Kakar, K. Prasad, A.P. Mähönen, C. Ambrose, M. Sasabe, G. Wachsmann, M. Luijten, T. Bennett, Y. Machida, R. Heidstra, G. Wasteneys, B.M. Mulder, B. Scheres, *A PLETHORA-Auxin transcription module controls cell division plane rotation through MAP65 and CLASP*, Cell **149**, 383–396 (2012).

5. D. Chaudhuri, A. Chaudhuri, *Modified fluctuation-dissipation and Einstein relation at nonequilibrium steady states*, Phys. Rev. E **85**, 021102 1-6 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. B.M. Mulder, *Modeling of microtubule self-organization in plant cell,* Gordon Conference Plant and Microbial Cytoskeleton, Andover, USA, August 14, 2012.

2. B.M. Mulder, *Spontaneous helicity in confined polymers*, Lorentz Center Workshop on Genome Mechanics at the Nuclear Scale, Leiden, the Netherlands, December 11, 2012.

3. B.M. Mulder, *Taking directions: Principles of self-organisation in the plant cortical array*, 108th Statistical Mechanics Meeting, New Brunswick, Canada, December 17, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. I.C. Garlea, B.M. Mulder, *Modeling of actin filaments in confinement* (poster), Winter School, Ascona, Switzerland, January 15-20, 2012.

2. I.C. Garlea, *Confined actin* (talk), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

3. B.M. Mulder, *Survival of the aligned: The ordering mechanism of the cortical microtubule array in plant cells* (talk), NVTB Meeting (Dutch society for Theoretical Biology), Schoorl, the Netherlands, May 24, 2012.

4. E.E. Deinum, *Walking the back alleys: a modelling study of symplastic transport* (talk), NVTB Meeting (Dutch society for Theoretical Biology), Schoorl, the Netherlands, May 24, 2012.

5. I.C. Garlea, *Modeling of confined actin* (talk), SPAT Meeting, Utrecht, the Netherlands, May 29, 2012.

6. I.C. Garlea, P. Mulder, B.M. Mulder, *Ordering of highly confined actin filaments (in circular geometry)* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

7. E.E. Deinum, *Walking the back alleys: a modelling study of symplastic transport* (talk), EPS PhD day, Amsterdam, the Netherlands, November 30, 2012.

8. E.E. Deinum, B.M. Mulder, *Playing the auxin pipeline- distinct signatures of local changes in influx, efflux and production* (poster), Auxin 2012, Waikoloa, USA, December 9-14, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. University of Amsterdam (R. van Driel): Chromosome organisation.
2. Wageningen University (T. Bisseling): Modelling root-nodule formation.
3. Wageningen University (M. Janson): Nuclear positioning in yeast.
4. Utrecht University/Wageningen University (Ben Scheres): Cell development.
5. Gero Steinberg (Exeter): Nucleopore distributions in fungi.
6. David Erhardt (Stanford): Light-induced microtubule reorientation in plants.
7. Chris Staiger (Indiana): Actin length distributions in plants.

c. Performances on television, radio or at public events

d. Publications in public magazines, newspapers or on the internet

1. B.M. Mulder, interview for the Parool Special on the Science Park Amsterdam Film festival, September 8, 2012.

e. Other professional products (software, prototypes, etc.)

Outreach

1. B.M. Mulder, *Tip Growth*, Onderwijsmodule in EZO22306 'Developmental Biology of Plants and Animals', Universiteit Wageningen, March, 2012.
2. B.M. Mulder, *Introduction and lecture "Why are Plants Long and Thin"*, AMOLF visit International Conference of Physics Students, August 8, 2012.
3. B.M. Mulder, Suggested and presented two movies: "*N is a Number*" and "*The Race for the Double Helix"* at the Science Park Amsterdam Film Festival, September 14, 2012.
4. B.M. Mulder, *Randomness*, Onderwijsmodule in PPS21306 'Modeling Biological Systems', Wageningen University, November, 2012.
5. B.M. Mulder, *ToolBox lectures "Cycles and Chaos" and "Models of epidemics"*, in PPS21306 'Modeling Biological Systems', Wageningen University, November, 2012.

Group P.R. ten Wolde 2012

Funding
FOM-Program Spatial design of biochemical regulation networks (SPAT)
FOM-Program Expanding society's toolbox to harvest solar energy (BF)
FOM-Program DNA in Action (DNAA)
FOM-Projectruimte (PR)
NWO-VICI (VICI)

Employees

Nils Becker (PD)	DNAA
Mark Bosman (stagiair)	-
Chris Govern (PD)	VICI
Andrew Mugler (PD)	VICI
Joris Paijmans (OIO)	PR
Wiet de Ronde (OIO)	VICI
Thomas Sokolowski (OIO)	SPAT
Martijn Wehrens (stagiair)	-

1. Academic publications

a. Peer reviewed Publications

1. T.R. Sokolowski, T. Erdmann, P.R. ten Wolde, *Mutual repression enhances the steepness and precision of gene experession boundaries*, PLoS Comput. Biol. **8**, e1002654 1-17 (2012).

2. N.B. Becker, R.J. Allen, P.R. ten Wolde, *Non-stationary forward flux sampling*, The Journal of Chemical Physics **136**, 174118-174118-18 (2012).

3. N.B. Becker, P.R. ten Wolde, *Rare switching events in non-stationary systems*, The Journal of Chemical Physics **136**, 174119-174119-15 (2012).

4. A. Mugler, A.G. Bailey, K. Takahashi, P.R. ten Wolde, *Membrane clustering and the role of rebinding in biochemical signaling*, Biophys. J. **102**, 1069-1078 (2012).

5. W.H. de Ronde, P.R. ten Wolde, A.M. Mugler, *Protein Logic: A Statistical Mechanical Study of Signal Integration at the Single-Molecule Level*, Biophys. J. **103**, 1097–1107 (2012).

6. W.H. de Ronde, F. Tostevin, P.R. ten Wolde, *Feed-forward loops and diamond motifs lead to tunable transmission of information in the frequency domain*, Phys. Rev. E **86** (2012).

7. F. Tostevin, W.H. de Ronde, P.R. ten Wolde, *Reliability of frequency and amplitude decoding in gene regulation*, Phys. Rev. Let. **108**, 108104 1–4 (2012).

8. C.C. Govern, P.R. ten Wolde, *Fundamental Limits on Sensing Chemical Concentrations with Linear Biochemical Networks*, PRL. **109**, 218103 (2012).

9. M. Flores, T.S. Shimizu, P.R. ten Wolde, F. Tostevin, *Signaling noise enhances chemotactic drift of E. coli*, Phys. Rev. Lett. **109**, 148101 1-5 (2012).

10. P.R. ten Wolde, *Biophysics: The price of accuracy*, Nature Phys. **8**, 361–362 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. W.H. de Ronde, *Multiplexing Biochemical Signals*, VU University Amsterdam, May 7, 2012.

e. Open Access publications

1. W.H. de Ronde, P.R. ten Wolde, A.M. Mugler, *Protein Logic: A Statistical Mechanical Study of Signal Integration at the Single-Molecule Level*, Biophys. J. **103**, 1097–1107 (2012).

2. F. Tostevin, W.H. de Ronde, P.R. ten Wolde, *Reliability of frequency and amplitude decoding in gene regulation*, Phys. Rev. Let. **108**, 108104 1–4 (2012).

3. T.R. Sokolowski, T. Erdmann, P.R. ten Wolde, *Mutual repression enhances the steepness and precision of gene experession boundaries*, PLoS Comput. Biol. **8**, e1002654 1-17 (2012).

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. P.R. ten Wolde, *Multiplexing Biochemical Signals*, Meeting Information Processing in Cells and Tissues, Cambridge, UK, March 31-April 2, 2012.

2. P.R. ten Wolde, *The robust ticking of a circadian clock: why two oscillators can be much more stable than one*, Lorentz Workshop Hacking the Biological Clocks: Circadian Rhythms and Photosynthesis, Leiden, the Netherlands, April 20, 2012.

3. A.M. Mugler, *Divide and conquer: the signaling benefit of spatial partitioning*, Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

4. P.R. ten Wolde, *Rare switching events in non-stationary and non-Markovian systems,* International Meeting Computation of Transition Trajectories and Rare Events in Non-Equilibrium Systems, Lyon, France, June 11-15, 2012.

5. P.R. ten Wolde, *Multiplexing Biochemical Signals,* 4th International Conference on Systems Biology of Mammalian Cells, Leipzig, Germany, July 9-11, 2012.

6. P.R. ten Wolde, *Spatio-temporal correlations can qualitatively change the behaviour of biological systems on cellular length scales: the implications for multi-scale modelling,* Lorentz Workshop Modelling the Dynamics of Complex Molecular Systems, Leiden, the Netherlands, August 31, 2012.

7. C.C. Govern, *Fundamental Limits on Sensing Chemical Concentrations with Linear Biochemical Networks*, Physics of Living Matter Conference, University College London, London, UK, September 13, 2012.

8. P.R. ten Wolde, *Multieplxing Biochemical Signals*, Meeting Statistical Physics and Information Processing in Biology, Paris, France, December 10, 2012.

9. P.R. ten Wolde, *The effect of crowding on biochemical networks*, Workshop Molecular Crowding, Brussels, Belgium, December 17, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. P.R. ten Wolde, *Robust formation of gene expression patterns: a story about diffusion* (talk), Universitat Bayreuth, Bayreuth, Germany, January 31, 2012.

2. T.R. Sokolowski, T. Erdmann, P.R. ten Wolde, *Mutual Repression enhances Gene Boundary Precision by Steepening* (talk), German Physical Society Spring Meeting, Berlin, Germany, March 25-30, 2012.

3. N.B. Becker, *Rare switching in non-stationary gene regulation networks* (talk), German Physical Society Spring Meeting, Berlin, Germany, March 25-30, 2012.

4. A.M. Mugler, *Divide and conquer: the signaling benefit of spatial partitioning* (talk), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

5. J. Paijmans, *The Fundamental Limit in the Noise of Transcriptional Regulation* (poster), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

6. J. Paijmans, *Deriving the fundamental lower limit of the noise in transcriptional regulation* (talk), VU-AMOLF Summer School, 't Vlintenholt, the Netherlands, June 24, 2012.

7. T.R. Sokolowski, L. Bossen, J. Paijmans, M. Wehrens, P. Recouvreux, N. Taberner, A. Grammoustianou, M. Dogterom, P.R. ten Wolde, *Modelling Cell Polarization with eGFRD* (poster), Workshop on Stochastic Modelling of Reaction-Diffusion Processes, Oxford, UK, July 9-11, 2012.

8. A.M. Mugler, *Divide and conquer: the signaling benefit of spatial partitioning* (talk), Workshop on Stochastic Modelling of Reaction-Diffusion Processes in Biology, University of Oxford, Oxford, UK, July 9-11, 2012.

9. W.H. de Ronde, *Multiplexing biochemical signals* (talk), Johns Hopkins University, Baltimore, USA, August, 2012.

10. N.B. Becker, *Rare switching in non-stationary gene regulation networks* (talk), Universitat Heidelberg, Heidelberg, Germany, September, 2012.

11. P.R. ten Wolde, *Spatio-temporal correlations and rebindings at molecular length scales can change the behavior of biological systems at cellular length scales* (talk), Freie Universitat, Berlin, Germany, September 25, 2012.

12. T.R. Sokolowski, T. Erdmann, N.B. Becker, P.R. ten Wolde, *Enhancing pattern stability in embryogenesis via mutual repression* (talk), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

13. A.M. Mugler, *Divide and conquer: the signaling benefit of spatial partitioning* (talk), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

14. J. Paijmans, *How precise can a cell regulate it protein levels?* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

15. N.B. Becker, *Rare switching in non-stationary gene regulation networks* (talk), MPI-PKS Dresden, Dresden, Germany, November, 2012.

16. P.R. ten Wolde, *Multiplexing Biochemical Signals* (talk), ETH Zurich, Basel, Switzerland, December 4, 2012.

c. Awards and recognitions

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

c. Performances on television, radio or at public events

1. P.R. ten Wolde, Meeting Wetenschap en Media, Radio Kootwijk, the Netherlands, June 8-9, 2012.

2. P.R. ten Wolde, Symposium Consciousness, Religion, and Morality; Daniel Dennett debates with members of De Jonge Academie, KNAW, Amsterdam, the Netherlands, November 15, 2012.

d. Publications in public magazines, newspapers or on the internet

1. P.R. ten Wolde, *De analoge computers van het leven*, De Groene Amsterdammer, 136, Special : Bèta-Wetenschapper, January, 2012.

2. Marianne Heselmans, *Eiwit zonder batterij,* C2W Life Sciences, November 10, 2012.

e. Other professional products (software, prototypes, etc.)

1. www.GFRD.org: Website for Green's Function Reaction Dynamics algorithm, a particle-based algorithm for simulating networks in time and space.

2. ggg.amolf.nl: Download site for "Gap Gene Gillespie" (GGG) simulator.

3. rebind.sourceforge.net: Website for software investigating molecular clustering and rebinding in biochemical signaling.

Outreach

1. P.R. ten Wolde, *Robust Formatino of Gene Expression Patterns,* Voordracht studenten Leiden University, AMOLF, Amsterdam, the Netherlands, May 16, 2012.

2. A.M. Mugler, P.R. ten Wolde, Advised Universiteit van Amsterdam bachelor's student on internship project, Amsterdam, the Netherlands, June 4 – July 17, 2012.

3. J. Paijmans, P.R. ten Wolde, *The fundamental lower bound of the noise in transcriptional regulation,* Master thesis at the University of Amsterdam, Amsterdam, the Netherlands, July 2012.

4. A.M. Mugler, Organized and led an hour-long tour of AMOLF for 25 incoming freshmen of Amsterdam University College, Amsterdam, the Netherlands, August 28, 2012.

5. A.M. Mugler, Advised Amsterdam University College bachelor's student on internship project, Amsterdam, the Netherlands, September 3–December 23, 2012.

6. A.M. Mugler, Introduced high school student to mathematical techniques, AMOLF, Amsterdam, the Netherlands, September 10, 2012.

7. P.R. ten Wolde, *Het tikken van een biologische klok,* Presentatie DJA Meeting, Amsterdam, the Netherlands, November 20, 2012.

8. J. Paijmans, *Hoe precies kan een cel zijn functies regelen?*, Voordracht voor o.a. 5,6-VWO leerlingen, onderdeel van de uitrijking van de Pieter Zeeman prijs, het Pontes Pieter Zeeman, Zierikzee, the Netherlands, November 23, 2012.

9. T.R. Sokolowski, *How diffusion affects noise in gene expression*, Voordracht studenten Leiden, AMOLF, Amsterdam, the Netherlands, December 10, 2012.

Group T.S. Shimizu 2012

Funding

FOM-Program Spatial Design of Biochemical Regulation Networks (SPAT)
FOM-Program Crowd management: The physics of genome processing in complex environments (CROWD)
FOM-Projectruimte (PR)
Paul G. Allen Family Foundation - Allen Distinguished Investigator (ADI) Award
NWO-VIDI (VIDI)

Employees

Francois Anquez (PD)	SPAT
Simone Boskamp (lab. assistent)	-
Sebastian Gude (OIO)	
Stephen Helms (PD)	VIDI
Istvan Kleijn (stagiair)	-
Milena Lazova (OIO)	SPAT
Bob Rosier (stagiair)	-
Katja Taute (PD)	VIDI

1. Academic publications

a. Peer reviewed Publications

1. M.D. Lazova, T.M. Butler, T.S. Shimizu, R.M. Harshey, *Salmonella chemoreceptors McpB and McpC mediate a repellent response to L-cystine: a potential mechanism to avoid oxidative conditions*, Mol Microbiol **84**, 697–711 (2012).

2. M. Flores, T.S. Shimizu, P.R. ten Wolde, F. Tostevin, *Signalling noise enhances chemotactic drift of E. coli*, Phys Rev Lett **109**, 148101 1-5 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

e. Open Access publicaties

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

1. T.S. Shimizu, *The role of randomness in bacterial behavior,* Physics of Behavior Workshop, Aspen Center for Physics, Aspen, USA, June 10-17, 2012.

2. T.S. Shimizu, *Bacterial chemotaxis: the "hydrogen atom" for cell signaling and behavior,* CeNS Workshop Nanosciences: Soft, Solid, Alive and Kicking, Venice, Italy, September 17-21, 2012.

3. T.S. Shimizu, *Cellular decision making in bacterial chemotaxis,* CIFAR Workshop on Cellular Decision Making, Toronto, Canada, November 10-12, 2012.

4. T.S. Shimizu, *Experimental dissection of bacterial chemotaxis strategies.* Workshop on Statistical Phyisics and Information Processing in Biology, Institut H. Poincaré (IHP), Paris, France, December 10-11, 2012.

b. Other lectures and posters at (international) conferences and other (scientific) meetings

1. M.D. Lazova, *E. coli vs. Salmonella: FRET-based comparative physiology of chemotactic network dynamics* (poster), Gordon Conference on Sensory Transduction in Microorganisms, Ventura, USA, January 15-20, 2012.

2. T.S. Shimizu, *Sensory response rescaling in bacteria* (talk), Center for Complex Systems Biology, University of Tokyo, Tokyo, Japan, May 2, 2012.

3. K.M. Taute, T.S. Shimizu, S.J. Tans, *An evolutionary view of chemotaxis* (poster), Physical Biology Circle Meeting, Paris, France, May 2-4, 2012.

4. S.J. Helms, *Interspecies Variation in Motile and Chemotactic Behavior in Nematodes* (talk), Virginia Commonwealth University, Richmond, USA, May 25, 2012.

5. K.M. Taute, T.S. Shimizu, S.J. Tans, *Why does E. coli have so many flagella?* (talk), VU-AMOLF Summer School, 't Vlintenholt, the Netherlands, June 24, 2012.

6. F. Anquez, *Quantitative PALM Imaging, localizing and counting proteins inside a cell* (talk), VU-AMOLF Summer School, 't Vlintenholt, the Netherlands, June 24, 2012.

7. M.D. Lazova, *Implementation of transfer functions in bacterial chemotaxis network* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

8. K.M. Taute, T.S. Shimizu, S.J. Tans, *An evolutionary view of chemotaxis* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

9. F. Anquez, *Spatial Organization of Bacterial Chemorecptors* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

10. S.J. Helms, *Structure of Behavioral Control and Motility Across Nematodes* (poster), Dutch Meeting on Molecular and Cellular Biophysics, Veldhoven, the Netherlands, October 1-2, 2012.

11. F. Anquez, *Spatial Organization of Bacterial Chemorecptors* (poster), Workshop on Physics From Cells to Tissues, Grenoble, France, October 22, 2012.

c. Awards and recognitions

1. T.S. Shimizu, Selected for Allen Distinguished Investigator Award from the Paul G. Allen Family (SPAT Foundation) (to be awarded in 2013, together with T. Emonet and S. Zucker, Yale University).

d. Board/Committee positions in congress organizations, scientific consortia, advisory councils, international panels, editorships at journals

1. T.S. Shimizu, Member Program Committee, The Sixth q-bio Conference, Santa Fe, USA, August 8-12, 2012.

3. Knowledge transfer (societal and economic)

a. Patents

b. Contacts with industry (including consultancy or other functions), new business activity resulting from projects

1. Leiden University (R. Dame): Superresolution and single-molecule imaging of bacterial chromosomes and associated proteins.

2. University of Amsterdam (P. Bolhuis): Conformational dynamics of chemoreceptors.

3. University of Amsterdam (K. Hellingwerf): Stroboscopic imaging of the bacterial stressosome.

4. U. Texas, Austin (R. Harshey): Chemotaxis signaling in *Salmonella*.

5. Rutgers University (E. Sontag): Theory of adaptive responses.

6. Institut Pasteur (M. Vergassola): Theory of bacterial chemotaxis strategies.

7. MIT (R. Stocker): Microfluidic devices for studying motile behavior of living cells.

8. IBM T. J. Watson Research Center (Y. Tu): Physical theory of chemotactic signaling in bacteria.

9. Yale University (T. Emonet): Modeling stochastic chemical reaction networks, and multiscale experiments on bacterial chemotaxis.

c. Performances on television, radio or at public events

d. Publications in public magazines, newspapers or on the internet

e. Other professional products (software, prototypes, etc.)

Outreach

1. T.S. Shimizu, An invited lecture for microbiology students, University of Bazel, Switzerland, January 12, 2012.

2. T.S. Shimizu, 1 lecture, 1 lab demonstration and 1 literature seminar for undergraduate physics "honors program", University of Utrecht, Utrecht, the Netherlands, February, 2012.

3. T.S. Shimizu, a lecture for AMOLF Nanophotonics Course at Philips Research, November 28, 2012.

4. T.S. Shimizu, an invited lecture for Molecular Biophysics Course, Leiden University, Leiden, the Netherlands, December 13, 2012.

5. T.S. Shimizu, Collaborator for the project *Living Mirror* by Howard Boland and Laura Cinti (C-Lab, UK), which won the Designers & Artists 4 Genomics Award (DA4GA) of the Netherlands Genomics Initiative and Naturalis Biodiversity Center, Leiden, the Netherlands, December, 2012.

Group M.J.J. Vrakking 2012

Funding

NWO-VICI (VICI)
NWO-CW-TOP (TOP)
EU-FLUX (FLUX)
EU-ICONIC (ICONIC)

Employees

Georg Gademann (OIO)	VICI
Ymkje Huismans (OIO)	
Axel Hundertmark (OIO)	TOP
Julia Jungmann (OIO)	
Freek Kelkenberg (OIO)	PLSM
Wing Kiu Siu (OIO)	PR
Tania Marchenko (OIO)	
Arnold Rouzée (OIO)	TOP
Aneta Smolkowska (OIO)	ICONIC

1. Academic publications

a. Peer reviewed Publications

1. M. Lucchini, K. Kim, F. Calegari, F. Kelkensberg, W. Siu, G. Sansone, M.J.J. Vrakking, M. Hochlaf, M. Nisoli, *Autoionization and ultrafast relaxation dynamics of highly excited states in N_2*, Phys. Rev. A **86**, 043404 1-4 (2012).

2. F. Kelkensberg, A.F. Koenderink, M.J.J. Vrakking, *Attosecond streaking in a nano-plasmonic field*, New J. Phys. **14**, 093034 1-19 (2012).

3. D.D. Hickstein, P. Ranitovic, S. Witte, X.-M. Tong, Y. Huismans, P. Arpin, X. Zhou, K.E. Keister, C.W. Hogle, B. Zhang, C. Ding, P. Johnsson, N. Toschima, M.J.J. Vrakking, M.M. Murnane, H.C. Kapteyn, *Direct visualization of laser-driven electron multiple scattering and tunneling distance in strong-field ionization*, Phys. Rev. Lett. **109**, 073004 1-5 (2012).

4. Y. Huismans, A. Gijsbertsen, A.S. Smolkowska, J.H. Jungmann, A. Rouzée, P.S.W.M. Logman, F. Lépine, C. Cauchy, S. Zamith, T. Marchenko, J.M. Bakker, G. Berden, B. Redlich, A.F.G. van der Meer, M.Yu. Ivanov, T.-M. Yan, D. Bauer, O. Smirnova, M.J.J. Vrakking, *Scaling laws for photoelectron holography in the midinfrared wavelength regime*, Phys. Rev. Lett. **109**, 013002 1-5 (2012).

5. A. Rouzée, F. Kelkensberg, W. Siu, G. Gademann, R.R. Lucchese, M.J.J. Vrakking, *Photoelectron kinetic and angular distributions for the ionization of aligned molecules using a*

HHG source, J. Phys. B **45**, SI 074016 1-11 (2012).

6. A.E. Boguslavskiy, J. Mikosch, A. Gijsbertsen, M. Spanner, S. Patchkovski, N. Gador, M.J.J. Vrakking, A. Stolow, *The multielectron ionization dynamics underlying attosecond strong field spectroscopies*, Science **335**, 1336-1340 (2012).

7. G. Sansone, F. Kelkensberg, F. Morales, J.F. Pérez-Torres, F. Martín, M.J.J. Vrakking, *Attosecond time-resolved electron dynamics in the hydrogen molecule*, IEEE J. Sel. Top. Quantum Electron. **18**, 520-530 (2012).

b. Publications in proceedings or other journals

c. Contributions to scientific books (chapters or entire book)

d. PhD theses

1. Y. Huismans, *Probing structure and dynamics with photoelectrons generated in strong fields*, Radboud University Nijmegen, May 2, 2012.

e. Open Access publications

2. Invited lectures, posters, awards and other activities

a. Invited lectures at international conferences and meetings

b. Other lectures and posters at (international) conferences and other (scientific) meetings

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d. Publications in public magazines, newspapers or on the internet

e. Other professional products (software, prototypes, etc.)

Outreach