

# Biological Soft Matter , G.H. Koenderink (2017-2022)

## Group output

### Peer reviewed Publications 2017-2022

#### 2017

1. B.E. Vos, L.C. Liebrand, M. Vahabi, A. Biebricher, G.J.L. Wuite, E.J.G. Peterman, N.A. Kurniawan, F.C. MacKintosh, and G.H. Koenderink, *Programming the mechanics of cohesive fiber networks by compression*, *Soft Matter* **13**: 8886-8893 (2017) (\*Cover article)
2. J. Alvarado, M. Sheinman, A. Sharma, F.C. MacKintosh, G.H. Koenderink, *Force percolation of contractile active gels*, *Soft Matter* **13**:5624-5644 (2017)
3. L. Langguth, A. Szuba, S. Mann, E. Garnett, G.H. Koenderink, A.F. Koenderink, *Nano-antenna enhanced two-focus fluorescence correlation spectroscopy*, *Sci. Rep.* 7:5985 (2017).
4. N.A. Kurniawan, T.H.S. van Kempen, S. Sonneveld, T.T. Rosalina, B.E. Vos, K.A. Jansen, G.W.M. Peters, F.N. van de Vosse, and G.H. Koenderink, *Buffers Strongly Modulate Fibrin Self-Assembly into Fibrous Networks*, *Langmuir* **33**: 6342-6352 (2017)
5. I.K. Piechocka, N.A. Kurniawan, J. Grimbergen, J. Koopman, G.H. Koenderink, *Recombinant fibrinogen reveals the different roles of alpha- and gamma-chain cross-linking and molecular heterogeneity in fibrin clot strain-stiffening*, *J. Thrombosis and Hemostasis* **15**:938-949 (2017).
6. K.A. Leonidakis, P. Bhattacharya, J. Patterson, B.E. Vos, G.H. Koenderink, J. Vermant, D. Lambrechts, M. Roeffaers, H. van Oosterwyck, *Fibrin structural and diffusional analysis suggests that fibers are permeable to solute transport*, *Acta Biomaterialia* **47**: 25-39 (2017)

#### 2018

1. V. Wollrab, J.M. Belmonte, M. Leptin, F. Nedelec, G.H. Koenderink, *Polarity sorting drives remodeling of actin-myosin networks*, *Journal of Cell Science* 132 (4) jcs.219717 (2018) **Green OA**
2. Y. Mulla, G.H. Koenderink, *Crosslinker mobility weakens transient polymer networks*, *Physical Review E*, 98, 062503 (2018) **Green OA**
3. C. Lopez, O. Saldanha, A. Aufderhorst-Roberts, C. Martinez-Torres, M. Kuijs, G.H. Koenderink, S. Köster, K. Huber, *Effect of ionic strength on the structure and elongational kinetics of vimentin filaments*, *Soft Matter*, 14 (42):8445-8454. (2018) (\*Cover article) **GOLD OA**
4. S. Mohan, G.H. Koenderink, K.P. Velikov, *Inelastic behaviour of cellulose microfibril networks*, *Soft Matter*, 14 (33): 6828-6834 (2018) **Green OA** (AMOLF repository)
5. K.A. Jansen, A. J. Licup, A. Sharma, R. Rens, M. Sheinman, F.C. MacKintosh, G.H. Koenderink, *The role of network architecture in collagen mechanics*, *Biophysical Journal*, 114 (11): 2665–2678 (2018) **Green OA** (AMOLF repository)
6. Y. Mulla, G. Oliveri, J.T.B. Overvelde, G.H. Koenderink, *Crack initiation in viscoelastic materials*, *Physical Review Letters*, 120 (26): 268002 (2018) **Green OA**
7. C.C.L. Schuurmans, A. Abbadessa, M.A. Bengtson, G. Pletikapic, H.B. Eral, G.H. Koenderink, R. Masereeuw, W.E. Hennink, T. Vermonden, *Complex coacervation-based loading and tunable release of a cationic protein from monodisperse glycosaminoglycan microgels*, *Soft Matter* 14 (30): 6327-6341 (2018) **Green OA** (AMOLF repository)
8. B. Dutta, B. Vos, Y. Rezus, G.H. Koenderink, H. Bakker, *Observation of ultrafast vibrational energy transfer in fibrinogen and fibrin fibers*, *Journal of Physical Chemistry B*, 122 (22): 5870–5876 (2018) **Green OA** (AMOLF repository)
9. Y. Mulla, A. Aufderhorst-Roberts, G.H. Koenderink, *Shaping up synthetic cells*, *Physical Biology*, 15 (4): 041001 (2018) **Green OA** (AMOLF repository)

10. M. Vahabi, B.E. Vos, H.C.G. de Cagny, D. Bonn, G.H. Koenderink, F. C. MacKintosh, *Normal stresses in semiflexible polymer hydrogels*, Physical Review E, 97 (3-1): 032418 (Editor's suggestion) (2018) **Green OA** (AMOLF repository)
11. G.H. Koenderink, E.K. Paluch, *Architecture shapes contractility in actomyosin networks*, Curr. Opin. Cell Biol. 50, 79-85 (2018) **Green OA** (AMOLF repository)
12. Yara Bachour, Lisanne J. Oei, Albert J. van der Veen, Bart E. Vos, Andre Louis, Stan Heukelom, Marco J. P. F. Ritt, Frank B. Niessen, Phil W. Koken, Hay A. H. Winters, *The Influence of Radiotherapy on the Mechanical Properties of Silicone Breast Implants*, PRS Global Open **13**, 1-6 (2018). **Gold OA**
13. R. Staneva, F. Burla, G. H. Koenderink, S. Descroix, D.M. Vignjevic, Y. Attieh and M. Verhulsel, *A new biomimetic assay reveals the temporal role of matrix stiffening in cancer cell invasion*, Mol.Biol.Cell **29**, 25: 2979-2988 (2018). **Green OA**
14. D. Visscher, A. Gleadall, J. Buskermolen, F. Burla, J. Segal, G.H. Koenderink, M. Helder, P. van Zuijlen, *Design and Fabrication of a Hybrid Alginate Hydrogel/poly( $\epsilon$ -caprolactone) Mold for Auricular Cartilage Reconstruction*, J Biomed Mater Res B Appl Biomater. (2018, Nov 1), doi:10.1002/jbm.b.34264, E-Pub ahead of print. **Green OA**

## 2019

1. K.J. A. Vendel, C. Alkemade, N. Andrea, G.H. Koenderink, and M. Dogterom, *In Vitro Reconstitution of Dynamic Co-organization of Microtubules and Actin Filaments in Emulsion Droplets*, Methods Mol. Biol. 2101, 53–75, Dec. 2019. **Not OA**
2. C. Martinez-Torres, F. Burla, C. Alkemade and G.H. Koenderink, *Revealing the assembly of filamentous proteins with scanning transmission electron microscopy*, PLoS One 14 (12) (2019). **Gold OA**
3. G.A. King, F. Burla, E.J.G. Peterman and G.J.L. Wuite, *Supercoiling DNA optically*, PNAS 116 (52), 26534-26539 (2019). **Hybrid OA**
4. I.C. Gârlea, O.J. Dammone, J. Alvarado, V. Notenboom, Y. Jia, G.H. Koenderink, D.G.A.L. Aarts, M.P. Lettinga and B.M. Mulder, *Colloidal Liquid Crystals Confined to Synthetic Tactoids*, Sci. Rep. 9, 1: 20391: 1-11 (2019). **Gold OA**
5. J. Alvarado, L. Cipelletti and G.H. Koenderink, *Uncovering the dynamic precursors to motor-driven contraction of active gels*, Soft Matter 15 (42), 8552-8565 (2019). **Hybrid OA**
6. G. Giubertoni, G.H. Koenderink and H.J. Bakker, *Direct Observation of Intrachain Hydrogen Bonds in Aqueous Hyaluronan*, J. Phys. Chem. A 123 (38), 8220-8225, (2019). **Hybrid OA**
7. A. Aufderhorst-Roberts and G.H. Koenderink, *Stiffening and Inelastic Fluidization in Vimentin Intermediate Filament Networks*, Soft Matter 15 (36), 7127-7136 (2019). **Green OA**
8. D.O. Visscher, A. Gleadall, J.K. Buskermolen, F. Burla, J. Segal, G.H. Koenderink, M.N. Helder and P.P.M. van Zuijlen, *Design and fabrication of a hybrid alginate hydrogel/poly( $\epsilon$ -caprolactone) mold for auricular cartilage reconstruction*, J. Biomed. Mater. Res., Part B 107B, (5), 1711-1721, (2019). **Hybrid OA**
9. Y. Mulla, F.C. MacKintosh and G.H. Koenderink, *Origin of slow stress relaxation in the cytoskeleton*, Phys.Rev.Lett. 122 (21), 218102: 1-6 (2019). **Green OA**
10. D.L. Perrier, A. Vahid, V. Kathavi, L. Stam, L. Rems, Y. Mulla, A. Muralidharan, G.H. Koenderink, M.T. Kreutzer and P.E. Boukany, *Response of an actin network in vesicles under electric pulses*, Sci. Rep. 9, 8151: 1-11 (2019). **Gold OA**
11. F. Fanalista, A. Birnie, R. Maan, F. Burla, K. Charles, G. Pawlik, S. Deshpande, G.H. Koenderink, M. Dogterom and C. Dekker, *Shape and Size Control of Artificial Cells for Bottom-Up Biology*, ACS Nano 13 (5), 5439-5450, (2019). **Hybrid OA**.
12. Y. Mulla, H. Wierenga, C. Alkemade, P.R. Wolde and G.H. Koenderink, *Frustrated binding of biopolymer crosslinkers*, Soft Matter 15 (14), 3036-3042 (2019). **Green OA**
13. G. Giubertoni, F. Burla, C. Martinez-Torres, B. Dutta, G. Pletikapić, E.G. Pelan, Y.L.A. Rezus, G.H. Koenderink and H.J. Bakker, *Molecular Origin of the Elastic State of Aqueous Hyaluronic Acid*, J. Phys. Chem. B 123, 14: 3043-3049 (2019). **Hybrid OA**

14. F. Burla, Y. Mulla, B.E. Vos, A. Aufderhorst-Roberts and G.H. Koenderink, *From mechanical resilience to active material properties in biopolymer networks*, Nature Rev. Phys. 1, 249-263 (2019). **Green OA**
15. F. Burla, J. Tauber, S. Dussi, J. Gucht and G.H. Koenderink, *Stress management in composite biopolymer networks*, Nature Phys. 15, 549-553 (2019). **Green OA**
16. G.A. King, F. Burla, E.J.G. Peterman and G.J.L. Wuite, *A Versatile Method to Quantify DNA-Protein Interactions on Negatively Supercoiled DNA*, Biophys. J. 116 (3), 214a-214a, (2019).
17. T. Xu, C. Langouras, M.A. Koudehi, B.E. Vos, N. Wang, G.H. Koenderink, X. Huang and D. Vavylonis, *Automated Tracking of Biopolymer Growth and Network Deformation with TSOAX*, Sci. Rep. 9, 1717: 1-13, (2019). **Gold OA**
18. M. Dogterom and G.H. Koenderink, *Actin–microtubule crosstalk in cell biology*, Nature Rev. Mol. Cell Biol. (2019). **Green OA**
19. D. van de Willige, J.J.A. Hummel, C. Alkemade, O.I. Kahn, F.K.C. Au, R.Z. Qi, M. Dogterom, G.H. Koenderink, C.C. Hoogenraad and A. Akhmanova, *Cytolinker Gas2L1 regulates axon morphology through microtubule-modulated actin stabilization*, EMBO Rep., e47732: 1-20, (2019). **Hybrid OA**

## 2020

1. G. Giubertoni, F. Burla, H.J. Bakker and G.H. Koenderink, *“Connecting the Stimuli-Responsive Rheology of Biopolymer Hydrogels to Underlying Hydrogen-Bonding Interactions”*, Macromolecules **53**, (23) 10503-10513 (2020) **Hybrid OA**.
2. J.J. de Vries, T. Hoppenbrouwers, C. Martinez-Torres, R. Majied, B. Özcan, M. van Hoek, W.G.F. Leebeek, D.C. Rijken, G.H. Koenderink and M.P.M. de Maat, *“Effects of Diabetes Mellitus on Fibrin Clot Structure and Mechanics in a Model of Acute Neutrophil Extracellular Traps (NETs) Formation”*, Int. J. Mol. Sci. 21, (19), 7107, (2020) **Gold OA**.
3. H.V.M. Kibbelaar, A. Deblais, F. Burla, G.H. Koenderink, K.P. Velikov and D. Bonn, *“Capillary thinning of elastic and viscoelastic threads: From elastocapillarity to phase separation”*, Phys. Rev. Fluids **5**, (9), 092001: 1-8 (2020).
4. K.A. Jansen, A. Zhmurov, B.E. Vos, G. Portale, D. Hermida-Merino, R.I. Litvinov, V. Tutwiler, N.A. Kurniawan, W. Bras, J.W. Weisel, V. Barsegov and G.H. Koenderink, *“Molecular packing structure of fibrin fibers resolved by X-ray scattering and molecular modeling”*, Soft Matter **16**, (35), 8272-8283 (2020) **Hybrid OA**.
5. E.P. van Dam, G. Giubertoni, F. Burla, G.H. Koenderink and H.J. Bakker, *“Hyaluronan biopolymers release water upon pH-induced gelation”*, Phys. Chem. Chem. Phys. **22**, (16), 8667-8671 (2020), **Green OA**.
6. F. Burla, S. Dussi, C. Martinez-Torres, J. Tauber, J. van der Gucht and G.H. Koenderink, *“Connectivity and plasticity determine collagen network fracture”*, PNAS **117**, (15), 8326-8334 (2020) **Green OA**.
7. R. Rodríguez-García, V.A. Volkov, C.-Y. Chen, E.A. Katrukha, N. Olieric, A. Aher, I. Grigoriev, M. Preciado López, M.O. Steinmetz, L.C. Kapitein, G.H. Koenderink, M. Dogterom and A. Akhmanova, *“Mechanisms of motor-independent membrane remodeling driven by dynamic microtubules”*, Current Biol. **30**, (6), 972-987 (2020) **Green OA**.
8. C.F.E. Schroer, L. Baldauf, L. van Buren, T.A. Wassenaar, M.N. Melo, G.H. Koenderink and S.J. Marrink, *“Charge-dependent interactions of monomeric and filamentous actin with lipid bilayers”*, PNAS **117**, (11), 5861-5872 (2020) **Hybrid OA**.
9. B.E. Vos, C. Martinez-Torres, F. Burla, J.W. Weisel and G.H. Koenderink, *“Revealing the molecular origins of fibrin's elastomeric properties by in situ X-ray scattering”*, Acta Biomaterialia **104**, (1), 39-52 (2020).
10. M.T.J.J.M. Punter, B.E. Vos, B.M. Mulder and G.H. Koenderink, *“Poroelasticity of (bio)polymer networks during compression: theory and experiment”*, Soft Matter **16**, (5), 1298-1305 (2020) **Green OA**.
11. F. Burla, T. Sentjabrskaja, G. Pletikapic, J. van Beugen, G.H. Koenderink, *“Particle diffusion in extracellular hydrogels”*, Soft Matter, 2020, **16**, 1366–1376 **Hybrid OA**

## 2021

1. C.J. Moll, G. Giubertoni, L. van Buren, J. Versluis, G.H. Koenderink and H.J. Bakker, Molecular Structure and Surface Accumulation Dynamics of Hyaluronan at the Water–Air Interface, *Macromolecules* 54, (18), 8655-8663 (2021) **Hybrid OA**
2. F. Iv, C.S. Martins, G. Castro-Linares, C. Taveneau, P. Barbier, P. Verdier-Pinard, L. Camoin, S. Audebert, F-C. Tsai, L. Ramond, A. Llewellyn, M. Belhabib, K. Nakazawa, A. Di Cicco, V. Vincentelli, Jerome Wenger, S. Cabantous, G.H. Koenderink, A. Bertin and M. Mavrikis, Insights into animal septins using recombinant human septin octamers with distinct SEPT9 isoforms, *J. Cell Sci.* 134, (15) (2021) **Green OA**.
3. L. Van de Cauter, F. Fanalista, L. van Buren, N. De Franceschi, E. Godino, S. Bouw, C. Denelon, C. Dekker, G.H. Koenderink and K.A. Ganzinger, Optimized cDICE for Efficient Reconstitution of Biological Systems in Giant Unilamellar Vesicles, *ACS Synth. Biol.* 10, (7), 1690-1702 (2021) **Hybrid OA**
4. A. Szuba, F. Bano, G. Castro-Linares, F. Iv, M. Mavrikis, R.P. Richter, A. Bertin and G.H. Koenderink, Membrane binding controls ordered self-assembly of animal septins, *eLife* 10, e63349: 1-35 (2021) **Gold OA**
5. G. Giubertoni, A. Pérez de Alba Ortíz, F. Bano, X. Zhang, R.J. Linhardt, D.E. Green, P.L. DeAngelis, G.H. Koenderink, R.P. Richter, B. Ensing and H.J. Bakker, Strong Reduction of the Chain Rigidity of Hyaluronan by Selective Binding of Ca<sup>2+</sup> Ions, *Macromolecules* 54, (3), 1137-1146 (2021) **Hybrid OA**

## 2022

- Y. Mulla, M.J. Avellaneda, A. Roland, L. Baldauf, W. Jung, T. Kim, S.J. Tans, G. H. Koenderink, *Weak catch bonds make strong networks*, *Nature Materials* 21: 1019–1023 (2022)
- C. Alkemade, H. Wierenga, V.A. Volkov, M. Preciado López, A. Akhmanova, P.R. Ten Wolde, M. Dogterom, G.H. Koenderink, *Cross-linkers at growing microtubule ends generate forces that drive actin transport*, *Proc Natl Acad Sci U S A.* 119 (11), 2022:e2112799119

## Contributions to scientific books (chapters or entire book) 2017-2022

- B. Gentry, S. Swei, J. Alvarado, L. Kreplak, G.H. Koenderink, *Mechanical properties of active biopolymer networks*, in: *Active Soft Matter: from dynamics to nano-machines*, Editor: Y. Roichman. World Scientific Series in Nanoscience and Nanotechnology: Volume 20, Soft Matter and Biomaterials on the Nanoscale, Volume 2: <https://doi.org/10.1142/11763-vol2> (2020)

## PhD theses 2017-2022

### 2018

1. B.E. Vos, *Fibrin structure and mechanics: a journey across scales*, Vrije Universiteit Amsterdam (05-10-2018)

### 2019

1. A. Szuba, *Deconstruction of Septin Assembly*, VU University Amsterdam, November 11, 2019.
2. Y. Mulla, *The cell: strong, soft matter*, VU University Amsterdam, February 8, 2019.

### 2020

1. G. Giubertoni, *“Shape and interactions of the building blocks of biomolecular architectures”*, University of Amsterdam, 2020-10-16, OA.
2. F. Burla, *“Tailoring Extracellular Matrix Mechanics”*, VU University Amsterdam, 2020-06-19, OA.

### 2021

1. O. Filina, Temporal dynamics in C. Elegans Development and stress response, Delft University of Technology, 31/03/2021 OA
2. C. Alkemade (2021, PhD thesis ' Reconstituting microtubule-actin coordination by cytolinkers',

## Masters and Bachelors theses 2017-2022

### 2018

1. Y. Mulla, F.C. MacKintosh, G.H. Koenderink, *Origin of soft glassy rheology in the cytoskeleton*, Preprint: [arXiv:1810.08165](https://arxiv.org/abs/1810.08165)
2. Bsc thesis; Erik van Lagen (2018), *Purification and in vitro characterization of GST-pVCA-His protein*, Hogeschool Utrecht (2018)
3. Msc thesis physics; *Septin as an actin-membrane linker*, Cees de Wit (2018), UvA Amsterdam
4. MSc thesis physics; Ruben Bosschaert (2018), *Breaking the putty: an inseparable breakup story*, UvA Amsterdam
5. Msc thesis physics; Jasmijn van Loo (2018), *Towards understanding cortex-membrane mechanics*, UvA Amsterdam
6. Msc thesis Medical Natural Sciences, Anne-Sophie van Schelt (2018), *Formation of actin-stabilized liposomes using continuous droplet interface crossing encapsulation (cDICE)*, VU Amsterdam
7. MSc literature thesis Medical Natural Sciences, Anne-Sophie van Schelt (2018), *Developments in fluctuation analysis on vesicles'*, VU Amsterdam
8. MSc thesis Molecular Life Sciences, Ilva Klomp (2018), *Cell-matrix interactions in tunable fibrin-collagen hybrid networks*, Radboud University Nijmegen
9. BSc thesis Biologie en Medische Laboratoriumonderzoeken; Jeffrey den Haan (2018), *The optimization of plectin purification*, Hogeschool Leiden
10. BSc thesis; Nemo Andrea (2018). *Actin-microtubule co-organization in microfluidic droplets*. Technische Universiteit Delft.

### 2019

1. Rashel Stefanis, *Cell-mediated remodelling of salmon fibrin networks, towards new neuronal scaffolds*, VU Amsterdam. (master thesis)
2. Sofija Vukovic, *Degradation of 3D Fibrin Hydrogels by Fibroblasts*, Amsterdam University College. (bachelor thesis)
3. James Fawcett, *Engineering Cytolinkers: For the In vitro reconstitution of cytoskeletal crosstalk in microtubule dynamics*, VU Amsterdam. (master thesis)
4. Joey van Beugen, *Diffusion in hyaluronic acid using differential dynamic microscopy*, VU Amsterdam. (minor thesis)
5. Migle Jakstaite (2019), *Mechanical and kinetic properties of the reconstituted actomyosin cortex on the giant unilamellar vesicles*, Radboud University Nijmegen. (master thesis)
6. Wiebe de Gruijter, *Rebuilding life: the formation and mechanical behavior of giant unilamellar vesicles made from E. Coli native lipids*, Amsterdam University College. (bachelor thesis)
7. Rosalie Klarenberg, *Master of the mDia1: in vitro reconstitution of actin polymerization from dynamic microtubules*, University of Amsterdam. (master thesis)

## Invited lectures at international conferences and meetings

### 2017

1. *Extracellular matrix mechanics across scales*, Annual ASCB-EMBO Meeting (Philadelphia, PA, USA, 2-6 December 2017)
2. *Cell-free reconstitution of cytoskeletal crosstalk*, EMBO workshop I LabEx INFORM 'Dynamics of living systems', Cargese, France, 25-29 september 2017

3. *Biophysical perspective on cytoskeletal crosstalk*, European Intermediate Filament Meeting 2017, Saint Malo, France, 14-17 June 2017
4. *Biophysical mechanisms of cytoskeletal crosstalk*, European Cytoskeletal Forum Meeting, Helsinki, Finland, 6-8 June 2017
5. *Interdependence of cytoskeleton and membrane organization*, Biophysical Society Annual Congress, New Orleans, Louisiana, USA, 11-15 February 2017
6. *Interdependence of cytoskeleton and membrane organization*, Annaberg conference 'Molecular Membrane Traffic and beyond – Emerging concepts in cell organization', Goldegg, Austria, 10-15 January 2017

## 2018

1. G.H. Koenderink: *Cell and tissue mechanics*, PhysCell 2018: EMBO Workshop Physics of cells - From Biochemical to Mechanical (Harrogate, UK, 3-7 September 2018)
2. G.H. Koenderink: *Role of bond reversibility in biopolymer network elasticity, fracture and plasticity*, 8<sup>th</sup> World Congress of Biomechanics (Dublin, Ireland, 8-12 July 2018)
3. G.H. Koenderink: *2018 P-G. de Gennes Prize award lecture: Physics of biological soft matter*, From solid state to biophysics IX Conference (Dubrovnik, Croatia, 16-23 June 2018)
4. G.H. Koenderink: *Cell and tissue mechanics*, Workshop on Multiscale mechanics in biology: current challenges and potential solutions for healthcare applications (Leeds, UK, 15-16 May 2018)
5. G.H. Koenderink, *Cell and extracellular matrix mechanics: a journey across scales*, Symposium on Cellular and Tissue Mechanics, (College de France, Paris, France, 10 April 2018)
6. C. Martinez-Torres, *"Multiscale mechanics of fibrin networks"* Joint Meeting of the European Society for clinical Hemorheology and Microcirculation, the International Society for Clinical Hemorheology, and the International Society of Biorheology (2018) Cracow, Poland.

## 2019

1. *Reconstituting cell shape control by the cytoskeleton*, Biomembrane Days 2019, Berlin, Germany, December 11-13, 2019.
1. *Self-organization of the cytoskeleton: the cell's mechanical machinery*, Cell Tiss Days 2019 - From cells to tissues: quantitative approaches to living systems, Giens, France, November 5-7, 2019.
2. *From mechanical resilience to active material properties in biopolymer networks*, Cell Physics conference, Saarbrücken, Germany, October 8-11, 2019.
3. *The paradoxical material properties of living matter*, APS March Meeting 2019, Boston, USA, March 4-8, 2019.
4. *Reconstitution of cells in a mechanical world*, Company of Biologists workshop: Reconstitution of cell cytoskeleton in vitro, Wiston House, Sussex, UK, January, 27-30, 2019.
5. *Living in a mechanical world*, Israel Biophysical Society Meeting, Tel Aviv, Israel, January 15, 2019.

## Academic Teaching 2017-2022

### 2018

1. G.H. Koenderink: Guest lecturer, *Mechanical behavior of living matter & Active force generation by the cellular cytoskeleton*, MSc. Course on materials, Wageningen University (10 September 2018)

### 2019

1. Gijsje Koenderink, *Active material properties of the cytoskeleton*, invited lecture for the Microswimmers lecture series, TU Dresden, Germany, April 12, 2019.
2. Lennard van Buren, Guest lecture: *Rebuilding the cell's skeleton*, Amsterdam University College.

## Selected awards & recognitions 2017-2022

### 2017

1. C. Alkemade, travel & course award for the MBL Physiology course (\$ 4442,25), Woods Hole, USA

### 2018

1. G.H. Koenderink: P-G. de Gennes Prize, awarded at the 9th From Solid State to Biophysics Conference
2. F. Burla: student travel award for the Designer Soft Matter meeting, Singapore, June 2018

### 2019

1. Gijssje Koenderink, NWO VICI grant (Talent scheme).
2. Federica Burla, Minerva Award, NWO Science Domain, awarded at Physics@Veldhoven 2020 meeting.
3. Lucia Baldauf, 1<sup>st</sup> place Poster Prize, NWO Life 2019.
4. Lucia Baldauf, Dutch Face of Science 2019, awarded by KNAW, de Jonge Akademie, and NEMO Kennislink.

## Valorization 2017-2022

N/A