

## Education

Ph.D. (January 2010, *Cum Laude*)  
*Single chirality through crystal grinding*

*Department of Solid State Chemistry,  
Radboud University Nijmegen, Nijmegen, NL,  
Prof. Dr. Elias Vlieg, thesis advisor.*

M.Sc. (August 2005)  
*with a minor in Organic Chemistry*

*Department of Solid State Chemistry,  
Radboud University Nijmegen, Nijmegen, NL,  
Prof. Dr. Elias Vlieg, thesis advisor.*

B.Sc. (August 2002)

*Chemistry at Radboud University Nijmegen, NL.*

## Relevant Research Experience

- 2015-present *AMOLF, Amsterdam, NL.* Group Leader **Self-Organizing Matter** group. Current research centers on the dynamic interplay between chemical reactions and crystallization phenomena to control the emergence of complexity in the solid state. Research activities include **self-assembly approaches** to direct **nucleation, crystal orientation, crystal phase, shape and chirality**.
- 2014-2015 *Radboud University Nijmegen, NL.* Assistant Professor in Solid State Chemistry. Research focused on **self-assembly approaches** to direct **nucleation, crystal orientation, crystal phase, and shape**.
- 2014-2015 *Harvard University, Cambridge MA, US.* Research Associate with **Prof. Dr. Joanna Aizenberg**. Research includes investigations on the **bioinspired** synthesis of **complex nanoscale architectures**.
- 2010-2013 *Harvard University, Cambridge MA, US.* Postdoctoral research fellowship with **Prof. Dr. Joanna Aizenberg**. Research pioneered the use of reaction/diffusion systems as a route to **complex nanoscale architectures**.
- 2009 *Universidad Complutense de Madrid, Madrid, SP.* Postdoctoral research fellowship working with **Dr. Cristobal Viedma** in the department of Crystallization and Mineralization on the **enantioenrichment and polymorphism of natural amino acids upon sublimation**.
- 2005-2010 *Radboud University Nijmegen, Nijmegen, NL.* Doctoral research entitled "Single Chirality through Crystal Grinding" in the department of Solid State Chemistry supervised by **Prof. Dr. Elias Vlieg**. Research focused on practical routes to **enantiomerically pure molecules** using a combination of **organic chemistry** and **crystallization** in an **asymmetric autocatalysis** process.
- 2004-2005 *Radboud University Nijmegen, Nijmegen, NL.* Major thesis research supervised by **Prof. Dr. Elias Vlieg** in the department of Solid State Chemistry. The research included the design, construction and use of an apparatus to investigate the **epitaxial vapor growth** crystallization of **organic molecules on inorganic substrates**.
- 2003 *Radboud University Nijmegen, Nijmegen, NL.* Minor thesis in the department of Organic chemistry under supervision of **Prof. Dr. Floris Rutjes**. The investigation explored a **chemoenzymatic total synthesis** of the **natural compounds** febrifugine and epiquinamide.

## Publications and Patents

1. I. Baglai, M. Leeman, R. M. Kellogg, W. L. Noorduin, "A Viedma ripening route to an enantiopure building block for Levetiracetam and Brivaracetam" *Organic & Biomolecular Chemistry*, 17, 35, 2019.
2. I. Baglai, M. Leeman, K. Wurst, B. Kaptein, R. M. Kellogg, W. L. Noorduin, "The Strecker Reaction coupled to Viedma Ripening: A Simple Route to Highly Hindered Enantiomerically Pure Amino Acids" *Chemical Communications*, 54, 10832, 2018.

3. W. J. P. van Enkevort, W. L. Noorduin, S. Graswinckel, P. Verwer, E. Vlieg “Epitaxy of Anthraquinone on (100) NaCl: A Quantitative Approach” *Crystal Growth & Design*, **18**, 5099, **2018** (DOI: 10.1021/acs.cgd.8b00546).
4. T. Holtus, L. Helmbrecht, H. C. Hendrikse, I. Baglai, S. Meuret, G. W. P. Adhyaksa, E. C. Garnett, W. L. Noorduin, “Shape-preserving transformation of carbonate minerals into lead-halide perovskite semiconductors based on ion exchange/insertion reactions” *Nature Chemistry*, **10**, 740, **2018**. (**Highlighted in Nature**).
5. L. Li, A. J. Fijneman, J. A. Kaandorp, J. Aizenberg, W. L. Noorduin, “Directed nucleation and growth by balancing local supersaturation and substrate/nucleus lattice mismatch” *Proceedings of the National Academy of Sciences*, **115**, 3575, **2018**.
6. C. N. Kaplan<sup>†</sup>, W. L. Noorduin<sup>†</sup>, L. Li, R. Sadza, L. Folkertsma, J. Aizenberg, L. Mahadevan “Controlled growth and form of precipitating microsculptures” *Science*, **355**, 1395, **2017**. <sup>†</sup>shared first author.
7. A. Grinthal, W. L. Noorduin, J. Aizenberg, ”A Constructive Chemical Conversation” *American Scientist*, **104**, 228, **2016**.
8. S. H. Kang, S. Shan, A. Košmrlj, W. L. Noorduin, S. Shian, J. C. Weaver, D. R. Clarke, K. Bertoldi, “Complex Ordered Patterns in Mechanical Instability Induced Geometrically Frustrated Triangular Cellular Structures” *Physical Review Letters* **112**, 098701, **2014**. (**Highlighted as "Editor's Suggestion" in Physical Review Letters**).
9. W. L. Noorduin<sup>\*</sup>, A. Grinthal, L. Mahadevan, J. Aizenberg<sup>\*</sup>, “Rationally Designed Complex, Hierarchical Microarchitectures”, *Science*, **340**, 832, **2013**. <sup>\*</sup> shared corresponding authorship (**Front cover and featured in ABC News, CNN, National Geographic, Discovery Channel, Le Monde, Science, Der Spiegel, Popular Science, NBC News, Chemistry & Engineering News, WIRED and >100 international media**).
10. S. H. Kang<sup>†</sup>, S. Shan<sup>†</sup>, W. L. Noorduin<sup>†</sup>, M. Khan, J. Aizenberg, Katia Bertoldi, “Buckling-Induced Reversible Symmetry Breaking and Amplification of Chirality Using Supported Cellular Structures”, *Advanced Materials*, **25**, 3380, **2013**. <sup>†</sup>shared first author. (**Highlighted in Nature Physics**).
11. C. Viedma, W. L. Noorduin, J. E. Ortiz, T. de Torres, P. Cintas, “Asymmetric Amplification in Amino Acid Sublimation Involving Racemic Compound to Conglomerate Conversion”, *Chemical Communications*, **47**, 671, **2011**.
12. R. E. Algra, V. Vonk, D. Wermeille, W. J. Szweyryn, M. A. Verheijen, W. J. P. van Enkevort, A. A. C. Bode, W. L. Noorduin, E. Tancini, A. E. F. de Jong, E. P. A. M. Bakkers, E. Vlieg, “Formation of Wurtzite InP Nanowires Explained by Liquid-Ordering”, *Nano Letters*, **11**, 44, **2011**.
13. W. L. Noorduin, H. Meekes, W. J. P. van Enkevort, B. Kaptein, R. M. Kellogg, E. Vlieg, “Enantioselective Symmetry Breaking Directed by the Order of Process Steps”, *Angewandte Chemie International Edition*, **49**, 2539, **2010**.
14. W. L. Noorduin, W. J. P. van Enkevort, H. Meekes, B. Kaptein, R. M. Kellogg, J. C. Tully, J. M. McBride, E. Vlieg, “The Driving Mechanism Behind Attrition-Enhanced Deracemization”, *Angewandte Chemie International Edition*, **49**, 8435, **2010**.
15. W. L. Noorduin, P. van der Asdonk P, A. A. C. Bode, H. Meekes, W. J. P. van Enkevort, E. Vlieg, B. Kaptein, M. W. van der Meijden, R. M. Kellogg, G. Deroover, “Scaling Up Attrition-Enhanced Deracemization by Use of an Industrial Bead Mill in a Route to Clopidogrel (Plavix)”, *Organic Process Research & Development*, **14**, 508 **2010**.
16. M. Leeman, W. L. Noorduin, A. Millemaggi, E. Vlieg, H. Meekes, W. J. P. van Enkevort, B. Kaptein, R. M. Kellogg, “Efficient Havinga-Kondepudi resolution of conglomerate amino acid derivatives by slow cooling and abrasive grinding”, *CrystEngComm*, **12**, 2051, **2010**.
17. W. L. Noorduin, A. A. C. Bode, M. van der Meijden, H. Meekes, A. F. van Etteger, W. J. P. van Enkevort, P. C. M. Christianen, B. Kaptein, R. M. Kellogg, T. Rasing, E. Vlieg, “Complete Chiral Symmetry Breaking of an Amino Acid Derivative Directed by Circularly Polarized Light”, *Nature Chemistry*, **1**, 729, **2009**. (**Highlighted in Nature Chemistry, Chemical & Engineering News, Chemistry World**).
18. W. L. Noorduin, P. van der Asdonk, H. Meekes, W. J. P. van Enkevort, B. Kaptein, M. Leeman, R. M. Kellogg, E. Vlieg, “Complete Chiral Resolution Using Additive-Induced Crystal Size Bifurcation During Grinding”, *Angewandte Chemie International Edition*, **48**, 3278, **2009**.

19. W. L. Noorduin, B. Kaptein, H. Meekes, W. J. P. van Enkevort, R. M. Kellogg, E. Vlieg, "Fast Attrition-Enhanced Deracemization of Naproxen by a Gradual In Situ Feed", *Angewandte Chemie International Edition*, **48**, 4581, **2009**.
20. W. L. Noorduin, E. Vlieg, R. M. Kellogg, B. Kaptein, "From Ostwald Ripening to Single Chirality", *Angewandte Chemie International Edition*, **48**, 9600, **2009**.
21. B. Kaptein, W. L. Noorduin, E. Vlieg, "Method for the Synthesis of Chiral Alpha-Aryl Propionic Acid Derivatives", *EP Patent Application*, filed February 6, **2009** WO/2010/089343, *assigned*.
22. M. W. van der Meijden, M. Leeman, E. Gelens, W. L. Noorduin, H. Meekes, W. J. P. van Enkevort, B. Kaptein, E. Vlieg, R. M. Kellogg, "Attrition-Enhanced Deracemization in the Synthesis of Clopidogrel - A Practical Application of a New Discovery", *Organic Process Research & Development*, **13**, 1195, **2009**.
23. W. L. Noorduin, H. Meekes, A. A. C. Bode, W. J. P. van Enkevort, B. Kaptein, R. M. Kellogg, E. Vlieg, "Explanation for the Emergence of a Single Chiral Solid State during Attrition-Enhanced Ostwald Ripening: Survival of the Fittest", *Crystal Growth & Design*, **8**, 1675, **2008**.
24. W. L. Noorduin, H. Meekes, W. J. P. van Enkevort, A. Millemaggi, M. Leeman, B. Kaptein, R. M. Kellogg, E. Vlieg, "Complete Deracemization by Attrition-Enhanced Ostwald Ripening Elucidated", *Angewandte Chemie International Edition*, **47**, 6445, **2008**. (**Hot paper**).
25. B. Kaptein, W. L. Noorduin, H. Meekes, W. J. P. van Enkevort, R. M. Kellogg, E. Vlieg, "Attrition Enhanced Deracemization of a Natural Amino Acid Derivative That Forms an Epitaxial Racemic Conglomerate", *Angewandte Chemie International Edition*, **47**, 7226-7229, **2008** (**cover image**).
26. M. A. Wijdeven, R. Wijdmans, R. J. F. van den Berg, W. L. Noorduin, H. E. Schoemaker, T. Sonke, F. L. van Delft, R. H. Blaauw, R. W. Fitch, T. F. Spande, J. W. Daly, F. P. J. T. Rutjes, "N,N-Acetals as N-Acyliminium Ion Precursors: Synthesis and Absolute Stereochemistry of Epiquinamide", *Organic Letters*, **10**, 4001-4003, **2008**.
27. W. L. Noorduin, T. Izumi, A. Millemaggi, M. Leeman, H. Meekes, W. J. P. van Enkevort, R. M. Kellogg, B. Kaptein, E. Vlieg, D. G. Blackmond, "Emergence of a Single Solid Chiral State from a Nearly Racemic Amino Acid Derivative", *Journal of the American Chemical Society*, **130**, 1158, **2008**. (**Highlighted in Nature**).

## Selected Honors, Awards & Grants

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|------|--|
| 2019 | Soft Advanced Materials (NWO), led by Prof. Katja Loos (RUG)   |
| 2018 | VIDI grant Netherlands Organisation for Scientific Research (NWO).   |
| 2016 | Top-Sector grant, AMOLF in collaboration with Syncom BV.   |
| 2013 | Science as Art 1 <sup>st</sup> place, MRS fall meeting, Boston, United States.   |
| 2013 | VENI grant Netherlands Organisation for Scientific Research (NWO).   |
| 2011 | Best Organic Chemistry Thesis Award, KNCV Backer prize.  |
| 2011 | Best Crystal Growth Thesis Award, Dutch Association for Crystal Growth.  |
| 2010 | Rubicon fellowship Netherlands Organisation for Scientific Research (NWO), Harvard University, Cambridge, United States. |
| 2009 | COST European Science Foundation fellowship, Universidad Complutense de Madrid, Madrid, Spain.                           |
| 2009 | DSM Science & Technology Award 2009, 2 <sup>nd</sup> place, Vaals, The Netherlands.                                      |
| 2008 | Best oral presentation, Solid state chemistry and Material science conference, Lunteren, The Netherlands.                |

## Teaching, Mentorship and Outreach Experience

For popular science talks see "Selected Talks"

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| 2019-present | Organizer weekly AMOLF colloquium   |
| 2015-2016    | Co-organized Chemical safety training for FOM Institute AMOLF, specifically developed practical chemical safety training. |

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2015-now	Co-founder and co-organizer of Tenure-Tracker program for Tenure Tracker group leaders at ARCNL/AMOLF.
2016	Guiding high school students in the Netherlands in growing microstructures.
2015	Exhibition “Creating Nano Flowers” as part of “Nature Made” exhibition with François Bernard at Maison et Objet, the largest architecture and design exhibition in Europe, Paris, France.
2014	Discussion leader Gordon Research Conference Seminar on Biomineralization, New London, NH, United States.
2013-2015	Co-teaching class on biomimicry at Massachusetts College of Art and Design.
2013-2015	Guiding high school students in the US (Ohio), The Netherlands and Germany in growing microstructures.
2012-2014	Co-organizing biweekly group meeting focused on crystallization and pattern formation in Aizenberg group at Harvard University.
2010-2012	Daily supervision and guidance of 2 B.Sc. and 4 M.Sc. students in the Aizenberg Biomineralization and Biomimetics lab at Harvard University.
2005-2009	Daily supervision and guidance of 4 B.Sc. and 3 M.Sc. students in the department of Solid State Chemistry at Radboud University Nijmegen.
2005-2009	Teaching assistant of Condensed Matter course at Radboud University Nijmegen.
2005-2009	Teaching assistant of Functionality of Molecules and Materials course at Radboud University Nijmegen.
2005-2009	Teaching assistant of lab course in crystal growth in the department of Solid State Chemistry at Radboud University Nijmegen.
2001-2005	Teaching assistant of lab introduction course to chemistry and biochemistry at Radboud University Nijmegen.

## Selected Talks

1. M2i Conference, Noordwijkerhout, The Netherlands, 10 December 2018, *Bio-inspired assembly of functional micro-architectures* (**invited keynote lecture**).
2. Solvay workshop “Chiral Symmetry Breaking at Molecular Level”, Brussels, Belgium, 29 November 2018, *Physical chemical routes to single handedness* (**invited lecture**).
3. Sixth European Conference on Crystal Growth (ECCG6), Varna, Bulgaria, 17 September 2018, *Controlling nucleation, growth and form of bio-inspired minerals* (**invited lecture, awarded best conference presentation**).
4. Soft Materials Structures and Devices seminar MIT, Massachusetts Institute of Technology, Cambridge (MA), US, 10 August 2018, *Bioinspired functional materials* (**invited lecture**).
5. Biomineralization Gordon Research Conference, Colby-Sawyer College, New London (NH), US, 2 August 2018, *Bio-inspired assembly of micro-architectures* (**invited lecture**).
6. CIMTEC Congress 2018, Perugia, Italy, 12 June 2018 *Bio-inspired self-organization of functional materials* (**invited lecture**).
7. Colloquium, DESY, Hamburg, Germany, 18 May 2018, *Bio-inspired assembled of functional materials* (**invited lecture**).
8. Seminar, 3mE, Process & Energy Faculty of Physics, Technical University Delft, Delft, The Netherlands, 16 May 2018, *Designing bio-inspired functional micromaterials* (**invited lecture**).
9. Colloquium, Faculty of Physics, Astronomy and Informatics, Nicolaus Copernicus University, Toruń, Poland, 10 May 2018, *Bio-inspired self-assembled microstructures* (**invited lecture**).
10. Colloquium, Faculty of Science and Engineering, Chuo University, Tokyo, Japan, 2 March 2018, *Bioinspired functional materials* (**invited lecture**).
11. The 1st JAIST World Conference, Japanese Advanced Institute of Science and Technology, Nomi, Ishikawa, Japan, 27-28 February 2018, *Bioinspired functional materials* (**invited lecture**).
12. UK-Netherlands Bilateral International Meeting, The Royal Society, Chicheley Hall, Newport, United Kingdom, 21-22 February 2018, *Self-assembled functional materials* (**invited lecture**).

13. Eindhoven Physics Symposium, Biomimicry: physics of nature, Eindhoven University of Technology, Eindhoven, The Netherlands, 20 December 2017, *Bioinspired assembly of functional materials* (**invited popular science lecture**).
14. CHAINS 2017 conference, Veldhoven, The Netherlands, 6 December 2017, *Synthesis of bioinspired self-assembled functional materials* (**invited lecture**).
15. UCL chemistry/physics colloquium, University College London, London, UK, 27 November 2017, *Self-assembled functional materials* (**invited lecture**).
16. IMM colloquium, Radboud University Nijmegen, 14 November 2017, *Self-assembled functional microstructures* (**invited lecture**).
17. Xiamen Soft Matter Forum 2017, Xiamen, China, 3 November 2017, *Self-assembled functional microstructures* (**invited lecture**).
18. AMOLF, Amsterdam, The Netherlands, 6 June 2017, *Een microwereld van zand en kalk* (**popular science lecture**).
19. Materials 2017, Veldhoven, The Netherlands, 1 June 2017, *Designing Complex Microstructures* (**invited keynote lecture**).
20. Interfacial Engineering colloquium, Chemical Engineering Department, Technical University Delft, Delft, The Netherlands, 6 March, 2017, *Uni-Chirality through crystal grinding* (**invited lecture**).
21. NIOZ Colloquium, NIOZ Royal Netherlands Institute for Sea Research, Texel, The Netherlands, 12 January 2017, *Designing complex microstructures* (**invited lecture**).
22. Chemistry department Colloquium, University of Bayreuth, Bayreuth, 9 January 2017, *Designing complex microstructures* (**invited lecture**).
23. Computational Science Lab colloquium, University of Amsterdam, Amsterdam, The Netherlands, 4 November 2016, *Designing complex microstructures* (**invited lecture**).
24. Seminar FOM DIFFER, Eindhoven, The Netherlands, 7 October 2016, *Designing complex microstructures* (**invited lecture**).
25. Annual meeting Dutch Association for Crystal Growth, Eindhoven, The Netherlands, 6 October 2016, *Balancing interfacial free energy & local supersaturation to direct nucleation and growth* (**invited lecture**).
26. FOM Institute AMOLF, Amsterdam, The Netherlands, 1 October 2016, *Een microwereld van zand en kalk* (**popular science lecture**).
27. Koninklijke Nederlandse Akademie van Wetenschappen, vergadering Chemie sectie, Amsterdam, The Netherlands, 27 June 2016, *Designing Complex Microstructures* (**invited lecture**).
28. CBU Colloquium, Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany, 23 June 2016 *Designing complex microstructures* (**invited lecture**).
29. ICMS Seminar, Eindhoven University, Eindhoven, The Netherlands, 17 June 2016, *Designing complex microstructures* (**invited lecture**).
30. Workshop "Anisotropy and Shape in Biological Materials: From Structure to Functionality", Lorentz Centre, Leiden University, Leiden, The Netherlands, 23 May 2016, *Designing complex microstructures* (**invited lecture**).
31. Mini Symposium of Advances in Crystal Nucleation and Growth, Eindhoven University of Technology, Eindhoven, The Netherlands, 9 March 2016. *Designing complex microstructures* (**invited lecture**).
32. EChem colloquium, Department of Chemical Engineering, Delft University of Technology, Delft, The Netherlands, 7 March 2016. *Designing complex microstructures* (**invited lecture**).
33. Popular Science program "Op het raakvlak van kunst en wetenschap" Spui25, Amsterdam, The Netherlands, 10 February 2016. *Zelf Organiserende Materie* (**invited popular science talk**).
34. CHAINS 2015, Utrecht, The Netherlands, 2 December 2015. *Designing complex microstructures*.
35. 19<sup>th</sup> Soft Matter Meeting, University Utrecht, Utrecht, The Netherlands, 9 November 2015. *Designing complex microstructures*.
36. Popular Science talk related to the movie "The creeping Garden", InScience Festival, Lux, Nijmegen, The Netherlands 5 November 2015. *The chemical garden* (**invited popular science talk**).
37. Department of Chemistry Research Seminar, New York University, New York City, US, 22 January 2015. *Emergence of complexity in the solid state* (**invited lecture**).

38. Department of Chemistry Research Seminar, Princeton University, Princeton, US, 13 January 2015.  
*Emergence of complexity in the solid state (invited lecture).*
39. Colloquium, FOM Institute AMOLF, Amsterdam, The Netherlands, 19 November 2014.  
*Rationally designed complex, hierarchical micro-structures (invited lecture).*
40. Department of Chemistry and Biochemistry Seminar, Concordia University, Montreal, Canada, 19 September 2014.  
*Rationally designed complex, hierarchical micro-structures (invited lecture).*
41. Squishy Physics Seminar, School of Engineering and Applied Sciences, Harvard University, Cambridge (MA), US, 13 August 2014.  
*Rationally designed complex, hierarchical micro-structures (invited lecture).*
42. Institute of Molecules and Materials Seminar, Radboud University, Nijmegen, The Netherlands, 4 August 2014.  
*Rationally designed complex, hierarchical micro-structures (invited lecture).*
43. MRS fall meeting 2013, Boston, US, 4 December 2013.  
*Interactive rational design of complex microstructures using microfluidics.*
44. Mechanical and Nuclear Engineering Department Graduate Seminar, The Pennsylvania State University, University Park, US, 29 October 2013.  
*Rationally designed complex, hierarchical micro-structures (invited lecture).*
45. Quantum Nanoscience lecture, Delft, The Netherlands, 25 September 2013  
*Rationally designed complex, hierarchical micro-architectures (invited lecture).*
46. International Materials Research Congress, Cancun, Mexico, 14 August 2013  
*Rationally designed complex, hierarchical micro-structures (invited lecture).*
47. Programmable Self-Assembly of Matter, New York University, New York City, US, 30 June  
*Rationally designed complex, hierarchical micro-architectures.*
48. 14<sup>th</sup> Dutch Soft Matter meeting, Twente University, Enschede, The Netherlands, 7 June 2013,  
*Rationally designed complex, hierarchical micro-architectures (invited keynote lecture).*
49. APS March Meeting, Baltimore (MD), US, 18 March 2013,  
*Reaction-diffusion controlled growth of complex structures.*
50. 3<sup>rd</sup> Conference on Multifunctional Hybrid and Nanomaterials, Sorrento, Italy, 4 March 2013  
*Emergence of complex structures by reaction-diffusion (invited lecture).*
51. Chemistry and Chemical Biology department seminar, Harvard University, Cambridge (MA), US, 15 February 2013.  
*Emergence of complex micro structures by reaction-diffusion (invited lecture).*
52. Biomineralization Gordon Research Conference, New London (NH), US, 13 August 2012,  
*Evolution of mineral structural complexity (invited lecture).*
53. Japanese-Netherlands Crystal Growth Conference, Sendai, Japan, 24 July 2012,  
*Reaction-diffusion controlled growth of complex structures (invited lecture).*
54. CHAINS 2011 Chemistry as Innovative Science conference, Maarssen, The Netherlands, 30 November 2011.  
*Single chirality through crystal grinding (KNCV Backer prize lecture).*
55. De Leidse Winterlezingen, Leiden, The Netherlands, 14 Februari 2010.  
*Waarom is de natuur links? (invited popular science lecture).*
56. Scientific meeting on Chemistry related to Physics & Material Sciences, Veldhoven, The Netherlands, 12 February 2010.  
*Single chirality through crystal grinding (invited keynote lecture).*
57. Centro de Astrobiologie, Madrid, Spain, 30 October 2009.  
*Grinding as a route to single chirality (invited lecture).*
58. IQPC Pharmaceutical Co-Crystals 2009, Amsterdam, The Netherlands, 22 September 2009  
*Grinding as a route to single chirality (invited lecture).*
59. DSM research awards 2009, Vaalsbroek, The Netherlands, 8 June 2009.  
*Grinding as a route to single chirality (DSM research award winner).*
60. COST Chirality Meeting, Brunnen, Switzerland, 16 May 2009  
*Grinding as a route to single chirality.*
61. Lecture Rheinisch-Westfälische Technische Hochschule Aachen, 12 January 2009  
*Attrition enhanced Ostwald ripening as a practical route to enantiopurity (invited lecture).*
62. UCT symposium, Groningen, The Netherlands, 21 November 2008.  
*Attrition enhanced Ostwald ripening as a practical route to enantiopurity (invited lecture).*
63. COST Biogenesis 2008, Maratea, Italy, 9 October 2008.

- The emergence of a single chiral solid phase under near-equilibrium conditions: Survival of the fittest (invited lecture).*
64. NLGUTS Symposium, Veghel, The Netherlands, 23 September 2008.  
*Attrition enhanced Ostwald ripening as a practical route to enantiopurity (invited lecture).*
  65. 17<sup>th</sup> International Symposium on Industrial Crystallisation, Maastricht, The Netherlands, 15 September 2008.  
*Attrition enhanced Ostwald ripening as a practical route to enantiomerically pure molecules. (invited lecture).*
  66. Chirality and crystallization, Radboud University, Nijmegen, The Netherlands, 20 June 2008.  
*How to enhance Ostwald ripening for complete deracemization (invited lecture).*
  67. SIMMposium, Radboud University Nijmegen, The Netherlands, 19 May 2008.  
*The emergence of a single chiral solid state during grinding.*
  68. Solid state chemistry and Material science, Lunteren, The Netherlands, 15 April 2008.  
*The emergence of a single chiral solid state during grinding (best oral presentation).*
  69. Nordita conference 'origins of homochirality', Stockholm, Sweden, 25 February 2008.  
*Complete deracemization by attrition enhanced Ostwald ripening (invited lecture).*
  70. 15<sup>th</sup> International Conference on Crystal Growth, Salt Lake City, USA, 14 August 2007.  
*Kinetic resolution of enantiomers via crystallization.*

## Selected media exposure

### A. Research on "Hierarchical complex micro architectures" has been featured in >100 international news outlets, e.g.:

1. "Beeld van de week" **De Volkskrant** (NL), June 9, 2018.
2. "Glow-in-the-dark semiconductor seashells" **Nature** June 4, 2018.
3. "Deze chemicus gaat als beeldhouwer te werk met microkristallen" **De Volkskrant** (NL), April 29, 2017.
4. "De kristalbloemen van Dr. Noorduin" **De kennis van nu** (popular national science television program) (NL), October 27, 2016.
5. "Microscopic crystal 'flowers' build themselves in a Harvard lab" **NBC News** (US), May 17, 2013.
6. "Des fleurs minérales microscopiques" **Le Monde** (FR), May 20, 2013.
7. "These self-assembling nanoflowers are as beautiful as they are tiny" **Popular Science** (US), May 22, 2013.
8. "These aren't flowers" **Gizmodo** (US), May 17, 2013.
9. "Spring has sprung in the lab" **Daily Mail** (UK), May 17, 2013.
10. "Komplexe Strukturen: Blumenwiese aus dem Labor" **Ingenieur** (DE), May 22, 2013.
11. "Microscopic flowers blooming in Harvard's lab" **ABC News** (US), May 30, 2013.
12. "Nanoflowers grow in tiny garden" **Discovery Channel** (US), May 24, 2013.
13. "Gorgeous nanocrystal flowers sprout under electron microscope" **Wired design** (US), May 29, 2013.
14. "How to grow a nanogarden" **Smithsonian** (US), May 29, 2013.
15. "Stunning microscopic 'flowers' created by chemical tweaking" **WIRED Magazine** (UK), May 23, 2013.
16. "Nanogardens' sprout up on the surface of a penny" **National Public Radio** (US), May 21, 2013.
17. "Say it with microflowers" **Irish Times** (IR), May 22, 2013.
18. "Microscopic flowers bloom in beaker" **Metro International** (CA), May 23, 2013.
19. "Look: Harvard researchers grow a garden at nano-scale" **Boston Business Journal** (US), May 21, 2013.
20. "Condições ambientais conseguem modelar estruturas minerais" **iG** (BR), May 16, 2013.
21. "Gärtnern in der Mikrowelt" **Neue Zürcher Zeitung** (CH), May 20, 2013.
22. "A rosy start" **National Geographic** (US), May 16, 2013.
23. "Bloemen kweken op microschaal" **NRC** (NL), May 18, 2013.
24. "Gorgeous, intricate microflowers from mineral chemistry in a beaker" **Chemistry & Engineering News** (US), May 20, 2013.
25. "Laat duizend kristallen groeien" **De Volkskrant** (NL), May 20, 2013.
26. "Harvard researchers grow a garden of nanoscience flowers" **Boston Globe** (US), May 17, 2013.
27. "Cómo construir un jardín de flores nanoscópicas" **Redacción 1** (SP), May 17, 2013.
28. "Very fine art: 6 stunningly beautiful nanoscale sculptures" **Scientific American** (US), May 19, 2013.
29. "Des fleurs minérales cultivées dans l'eau" **La Recherche** (FR), July 1, 2013.
30. "Garten der Moleküle" **Geo** (DE), September 1, 2013.
31. "In the Nanogarden" **New Scientist** (US), June 1, 2013
32. "Blühende Kristalle" **Der Spiegel** (DE), 22, 2013.

33. "Rose in Nano" **Spektrum der Wissenschaft** (DE), May 17, 2013.
34. "Complexity from simplicity" **Science** (US), May 17, 2013.
35. "Il giardino dei nanofiori di cristallo" **Focus** (IT), June 3, 2013.
36. "En maiblostm av mineraler" **Forskning och Framsteg** (SE), May 17, 2013.
37. "Für Ihren Garten oder Balkon sind diese Blumen nichts" **Lufthansa** (DE), December 2013.
38. "Un Giardino di molecule" **Geo** (IT), January, 2014.
39. "Crystal nano flowers and the future of architectural chemistry" **The Creators Project** (US), June 2014.
40. "Sculpting flowers smaller than a human hair" **CNET** (US), June 11, 2014.
41. "Tiny, delicate flowers grown in a beaker help to explain complex structures" **Inside Science**, May, 2014.
42. "These aren't flowers, they are sculptures as thin as a hair" **CNN** (US), August 5, 2014.
43. "Breaking new ground" **Metropolis; architecture and design at all scales** (US) April 2015 (**front cover**).

#### **B. Selection of media exposure on "routes to single handedness through crystal grinding":**

1. "Building blocks of life: Growing the seeds of homochirality" **Nature Chemistry**, 1,692 (2009).
2. "Sterrenlicht geeft draai aan oersoep" **Spits** (NL), 20 November 20, 2009.
3. "Het licht uit jonge sterren bevoordeelt linkshandige moleculen en zo het leven" **NRC** (NL), 7 November, 2009.
4. "Sparking a sign of life" **Chemical & Engineering News**, 87, 45 (2009).
5. "How light gave life a helping hand" **Chemistry World** (US) November 1, 2009.
6. "Nieuwe draai aan kristallen" **C2W** (NL), October 24, 2009. (**Front cover**)
7. "Did life grind to a start" **Nature** 452, 161-162 (2008).
8. "Linksom of rechtsom" **De Standaard** (BE), March 21, 2008.
9. "Linksom of rechtsom" **NRC** and **NRC-Next** (NL), March 15, 2008.
10. "Linksdraaiende moleculen maken" **Noorderlicht** (Dutch national radio program) March 29 2008.
11. "Nieuwsuitzending" **Omroep Gelderland** (Dutch television), March 29, 2008.

## Academic Service

- A. *Grant reviewing*: NIH, NASA Origins of Solar Systems Program.
- B. *Journal reviewing*: Nature Chemistry, Nature Materials, Nature Communications, Science, Proceedings of the National Academy of Sciences, Advanced Materials, Industrial & Engineering Chemical Research, CrystEngComm, Journal of Chemical Physics, Small, Chemistry of Materials, Journal of American Chemical Society, Crystal Growth and Design, Journal of Physical Chemistry, Journal of Systems Chemistry, Angewandte Chemie International Edition, Crystal Growth and Design, Journal of Crystal Growth, Organic & Biomolecular Chemistry.
- C. *PhD thesis committee member*:  
 H.C.B. Florijn "Programmable mechanical metamaterials" (Leiden University, 2016)  
 W. B. de Poel "Muscovite mica based templates for monolayer formation and crystal growth" (Radboud University Nijmegen, 2017).  
*PhD manuscript commission member*:  
 E.R. Townsend "Insights into the role of additives as anticaking agents for sodium chloride" (Radboud University Nijmegen, 2018).  
 A.H.J. Engwerda "Deracemization on the edge of stability" (Radboud University Nijmegen, 2019).
- D. *Organization symposia/session*:  
 Co-Organizing the Dutch Association for Crystal Growth Spring meeting 2018.  
 Co-organizer and session chair "Animated matter: active soft materials" at Physics at Veldhoven 2017.  
 Co-organizer focus session "Bio-inspired Materials" CHAINS 2017.