

Resume Paul Kouwer – March 2022

SUMMARY

Name: Paul H. J. Kouwer
Affiliation: Radboud University Nijmegen
Peer-reviewed publications: 105
H-index, citations: 35, 3700 (Google Scholar, March 2022)
ResearcherID / ORCID: [B-4847-2008 / 0000-0002-2760-191X](https://orcid.org/0000-0002-2760-191X)
Website: www.ru.nl/molecularmaterials
Twitter: @KouwerLab

RESEARCH SUMMARY

Since 2017, I independently manage a research group at the interface of chemistry, soft matter and applications of soft materials in biology. The group focuses on the development of synthetic gels that closely mimic many aspects of biological gels present in and around our own cells. We design smart, adaptive materials, and simultaneously, study how we can use the incredible level of control to direct cell behaviour *in vitro*. With collaborators, we take the next step and develop *in vivo* applications.

WORKING EXPERIENCE

2019 – now Associate Professor Radboud University, Nijmegen, NL
2009 – 2019 Assistant Professor Radboud University, Nijmegen, NL
2017 – 2018 Acting head department of Molecular Materials, Radboud University, Nijmegen, NL
2008 – 2009 Research Fellow Radboud University, Nijmegen, NL with Prof. A.E. Rowan
2004 – 2007 Marie Curie Outgoing International Fellow, Massachusetts Institute of Technology (MIT), US and Radboud University, NL with Profs. T.M. Swager (MIT) and Th. Rasing (RU)
2004 Visiting Scientist University of Patras, Greece with Prof. D. Photinos and dr. A. Vanakaras
2001 – 2003 Ramsay Memorial Fellow, University of Hull, UK with Profs. J.W. Goodby and G.H. Mehl

EDUCATION

2013 Academic Leadership Programme (RU Nijmegen)
2012 National University Teaching Qualification (RU Nijmegen)
1997 – 2001 Ph.D. Student at the Delft University of Technology, NL; Advisor: Prof. S.J. Picken, Thesis “Mesophase formation in discotic liquid crystalline polymers”
1997 – 2002 Post-graduate courses: Summer school in Synchrotron Radiation (Daresbury, UK); RPK (polymer science: 5 modules of 12 days); Supramolecular Chemistry (4 two-day workshops).
1991 – 1996 M.Sc. Chemistry at the University of Groningen; Advisors: Prof. G. Hadziioannou
Specialisation: Polymer Chemistry and Organic Chemistry/Chemical Engineering

FUNDING ID AND AWARDS

2021 PI Demonstrator grant “Demonstrating the scalability of PIC gels” (1 PD position)
2020 PI ZonMW TOP grant “Tissue-engineering approach to reduce the risk on recurrent prolapse” (Collaboration with Prof. JP Roovers, AMC, 1 PhD position)
2019 PI ICI Gravitation grant “Tunable synthetic immune niches” (Collaboration with Prof. C. Figdor, RUMC, 1 PhD position)

- 2018 PI FMS Gravitation grant “Control of alignment in supramolecular biomaterials” (Collaboration with Prof. Dankers, TUE, 1 PhD position)
- 2016 Best Teacher Award, Molecular Sciences, Radboud University
- 2015 PI H2020 EU Training Network “Biogel” (2 PhD positions)
- 2015 – 2012 5× NWO Dubble ESRF BM26b exps. (5 × 72 hr synchrotron funded beam time)
- 2014 PI NWO Gravitation programme Functional Molecular Systems (2 PhD positions)
- 2013 EuroMagnet II, calls 212,213 “Anisotropic membranes through photopolymerisation of aligned liquid crystals” and “Anisotropic hydrogels” (2×60 hrs 20 T magnet time)
- 2012 PI Radboud University consortium “The Bionic Cell” (1 PhD position)
- 2012 PI “complex Molecular Systems” BAZIS Grant for equipment (iTC, k€ 149)
- 2011 PI “Morphology control in organic photovoltaics” IMM shared PhD positions (1 PhD position, shared with Dr. J. Schermer)
- 2010 PI “Hierarchical 3D assembly from patterned surfaces” Nanonext" project 7A-7 (in collaboration with industrial partner Encapson, 1 PhD position).
- 2008 PI EU project PITN-CT-2007-215851 “HIERARCHY” (2 PhD positions).
- 2003 Marie Curie Outgoing International Fellowship (EU, k€ 280)
- 2002 2nd prize Chemistry and Technology Award (DSM, NL, € 5.000)
- 2001 Ramsay Memorial Fellowship (UCL, UK, € 60.000)

OTHER ACADEMIC ACTIVITIES

Research Networks:

- 2014 – 2018 Member Marie Curie European Training Network “Biogel”
- 2013 – 2017 Associate Member Marie Curie European Training Network “iTerm”
- 2010 – 2015 Co-director of the national Nanonext programme “Supramolecular and Bio-Inspired Materials” (with Prof. Alan Rowan, RU). Overall budget 8.1 M€.
- 2009 – 2013 Member Marie Curie Initial Training Network “Superior”
- 2008 – 2012 Co-coordinator and daily management Marie Curie Initial Training Network “Hierarchy” (with Profs. Alan Rowan and Theo Rasing, RU). Overall budget 4.6 M€.

Conference and workshop organisation

- 2017 Coordinator and teacher post-graduate RPK-C course (50 participants, 10 days)
- 2017 Member CHAINS2017 Study Group Committees Chemistry of Materials and Chemistry of Life
- 2016 Organiser Two-day workshop “Hydrogel Mechanics” (25 participants)
- 2014 Organising committee: 1st NextGenChem meeting (50 participants)
- 2010 Organising committee; Annual Symposium Institute for Molecules and Materials. RU Nijmegen (200 participants)
- 2009 Conference Secretary 4th International Symposium on Macrocyclic and Supramolecular Chemistry (ISMCS2009) in Maastricht (380 participants)

Other activities

- 2019 – now Programme coordinator BSc and MSc programme “Science” RU Nijmegen
- 2018 – now Board member KNCV section Soft Matter
- 2017 – now Programme coordinator MSc Track “Molecular Chemistry” RU Nijmegen
- 2016 – 2019 Examination board Molecular Sciences, RU Nijmegen
- 2014 – now Library Committee, RU Nijmegen
- 2012 – 2019 Education committee Molecular Sciences, RU Nijmegen
- since 2008
- Reviewer for scientific journals, incl. from JACS, Nature Chemistry, Nature Communications, Advanced Materials, PNAS.
 - Reviewer for grant proposals: e.g. NSF, ERC and the British, Dutch, Flemisch, Polisch, Swiss, South African Science Foundations.

TEACHING

2020 – now	Organic Chemistry 1 (6EC, BSc, 1 st year 200 students)	2021 student grade: 8.6
2016	Best Teacher Award, Molecular Sciences	
2010 – now	Molecular Structure (3EC, BSc, 1st year 180 students)	2021 student grade: 8.0
2016 – 2020	Reactions and Kinetics (3EC, BSc, 1st year 180 students)	
2008 – 2020	Molecular Materials (3EC, MSc, 4th year, 30 students)	
2013 – now	Materials Science (3EC, MSc, 4 th year, 30 students, shared with 5)	
2009 – 2016	Advanced synthesis lab class (BSc, 3rd year, 20 students; coordinator)	
2012 – 2018	Physical Organic Chemistry (BSc, 3rd year, 60 students)	
2008 – 2012	Organic Chemistry II (BSc, 3rd year, 30 students)	
2012 – now	Mentor Radboud Honour's Academy (top 5% science students)	

SUPERVISION

Post-docs

Dr. Behrad Shaghaghi [‡]	2021 – 2022	Ying Zhang	2015 – 2019
Dr. Giorgio Mirri	2010 – 2012	Zhaobao Zhang [‡]	2015 – 2019
Dr. Jialiang Xu	2010 – 2013	Joan Simo Padial	2013 – 2017
Dr. Laura Cattaneo	2010 – 2012	Daniel Schoenmakers	2014 – 2018

PhD Students

Lotte Gerrits [‡]	2020 – 2024	Maarten Jaspers	2012 – 2016
Melissa van Velthoven [‡]	2019 – 2023	Jon Feenstra	2012 – 2016
Jyoti Kumari [‡]	2018 – 2022	Pim van der Asdonk	2012 – 2016
Wen Chen [‡]	2017 – 2021	Jan Lauko	2012 – 2016
Hongbo Yuan*	2016 – 2018	Egle Sirtautaite-Sidlauskiene	2010 – 2014
Paula de Almeida	2015 – 2019	Alexandra Alvarez Fernandez	2009 – 2014
Kaizheng Liu	2015 – 2019	Michal Juricek	2005 – 2010
		Bram Keereweer	2005 – 2009

* Dual graduation Hebei University of Technology/Radboud University.

[‡] Current group members

Undergraduate students

Currently, I host 6 MSc students and 1 BSc student in the group. Over 2018, I supervised 9 MSc and 1 BSc student. Typically, the students in the Molecular Materials group have different backgrounds, ranging from Chemistry and Science to Molecular Life Sciences and Medical Biology, which makes it a very interdisciplinary scientific environment.

ACTIVE COLLABORATIONS

National

Egbert Oosterwijk	RU Medical Center, Urology (regenerative medicine)
Cees Storm	Eindhoven University of Technology (network modelling and simulations)
Giuseppe Portale	University of Groningen (hydrogel scattering)
Patricia Dankers	Eindhoven University of Technology (supramolecular biomimetic materials)
Jan-Paul Roovers	Amsterdam Medical Centre, Urogynaecology (wound healing)
Frank Wagener	RU Medical Centre, Dentistry (wound healing)
Rint Sijbesma	Eindhoven University of Technology (functional materials)
Carl Figdor	RU Medical Centre, Cancer Immunology (immunology)
Paul Span	RU Medical Centre, Radiotherapy (regenerative medicine)

International

Johan Hofkens	KU Leuven, Belgium (super resolution microscopy)
Susana Rocha	KU Leuven, Belgium (microscopy and life-cell imaging)
Fred MacKintosh	Rice University, Houston, US (network modelling and simulations)
Peter Collings	Swarthmore college, US (chromonic LCs and depletion interactions)
Paul Jamney	UPenn, Philadelphia, US (hydrogels)
Martin Möller	RWTH Aachen, Germany (hydrogels)
Laura Delaporte	RWTH Aachen, Germany (synthetic ECMs)
Timothy Swager	MIT, Cambridge MA, US (liquid crystals)

10 RECENT KEY PUBLICATIONS (all as principle investigator & corresponding author):

Full list on [ORCID](#) or [Google Scholar](#) (including citations)

Biomimetic hydrogel development

1. P.H.J. Kouwer, *et al.* "Responsive biomimetic networks from polyisocyanopeptide hydrogels" *Nature* **493**, 651-655 (2013).
2. M. Jaspers, *et al.* "Nonlinear mechanics of hybrid polymer networks that mimic the complex mechanical environment of cells" *Nat. Commun.* **8**, 15478 (2017).
3. D.C. Schoenmakers, *et al.* "Crosslinking of fibrous hydrogels" *Nat. Commun.* **9**, 2172 (2018).
4. P. de Almeida *et al.* "Cytoskeletal stiffening in synthetic hydrogels" *Nat. Commun.* **10**, 609 (2019).
5. W. Chen, *et al.* 'Magnetic Stiffening in 3D Cell Culture Matrices' *Nano Lett.* **2021**, *21*, 6740.
6. A. Liu, *et al.* The living interface between synthetic biology and biomaterial design. *Nat. Mater.* **21**, 390 (2022).

Biological applications of PIC hydrogels

7. R.C. op 't Veld, *et al.* 'Thermosensitive biomimetic polyisocyanopeptide hydrogels may facilitate wound repair' *Biomaterials* **2018**, *181*, 392.
8. B. Wang, *et al.* 'A tunable and injectable local drug delivery system for personalized periodontal application' *J. Control. Release* **2020**, *324*, 134.
9. K. Liu, *et al.* 'Synthetic Extracellular Matrices as a Toolbox to Tune Stem Cell Secretome' *ACS Applied Materials and Interfaces* **2020**, *12*, 56723.
10. Y. Zhang, *et al.* 'Polyisocyanide Hydrogels as a Tunable Platform for Mammary Gland Organoid Formation' *Adv. Sci.* **2020**, *7*, 2001797.

Patents

1. M. Jaspers, P. De Almeida, A.E. Rowan, P.H.J. Kouwer "Biomimetic double network hydrogels" Patent WO2018/197416A1/EP3395861A1, RU, Nijmegen: The Netherlands.
2. D. Schoenmakers, A.E. Rowan, P.H.J. Kouwer "Biomimetic networks comprising polyisocyanopeptide hydrogels" Patent WO2018/104324A1, RU, Nijmegen, The Netherlands.
3. P. Van Der Asdonk, P.H.J. Kouwer "Stable and homogeneous LCLC alignment on polyimide surfaces" Patent WO2017150971, RU, Nijmegen, The Netherlands.
4. P.H.J. Kouwer, G.H. Mehl; "Combined rod-disc systems with unusual nematic properties" Patent WO2004/048499, University of Hull, UK, 2002.

Books and Book sections

1. A.B. Keereweer, P.H.J. Kouwer, E. Schwartz, S. Le Gac, R.J.M. Nolte, A.E. Rowan "Chromophoric polyisocyanide materials" In *Functional Supramolecular architectures for organic electronics and nanotechnology*; P. Samori, F. Cacialli, Eds.; Wiley-VCH: Weinheim, 2010, p 135-154.
2. P.H.J. Kouwer "Mesophase formation in discotic liquid crystalline polymers" Delft University Press, 2002.

LECTURES AT INTERNATIONAL CONFERENCES, INSTITUTES AND WORKSHOPS

Over the past years, I have presented my work as invited lecture or oral contribution at a variety of (inter)national conferences (>30 in the past 5 years). In addition, I presented at institutes in the Netherlands and abroad and contributed to international workshops.

PRESS COVERAGE:

Scientific:

- M.L. Gardel “Synthetic polymers with biological rigidity” *Nature* **2013**, 493, 618.
- J.M. Schnorr, T.M. Swager “Click and Homocoupling for Extended π -Systems” *Synfacts* **2011**, 9, 958.
- T. Andrews, T.M. Swager “Unusual Liquid Crystal Organization” *Synfacts* **2007**, 5, 1266.
- M. Lavine “Complex discs” *Science* **2002**, 296, 983.

Popular:

- M. Hestericová “New hydrogel stiffens and softens like a natural muscle” *PhysicsWorld* **2019**, [link](#).
- M. van den Berg “Hydrogel trekt samen als een spier” (Dutch) *C2W*, **2019**, [link](#).
- E. Thole “Gel met regelbare stijfheid verbetert celkweek” (Dutch) *NemoKennislink*, **2019**, [link](#).
- K. Moons “Nanotechnology in health care” *De Gelderlander*, **2016**, [link](#).
- P. Marx “Polymers as spray band aid” *C2W*, **2016**, [link](#).
- M. Zuidweg “Lucky breaks in science” *VOX Magazine*, **2016**, [link](#).
- M. van der Meer, “Triple surprise” *ExperimentNL*, **2014**, [link](#).
- A. Vrouwe “From chance discovery to wound healing plaster” *NanoNextNL Magazine*, **2013**, [link](#).
- N. Drake “New Supergel Has Strange Biological Properties” *wired.com*, **2013**, [link](#).
- B. Coxworth “New “super gel” is liquid when cold and stiffens when heated” *gizmag.com*, **2013**, [link](#).
- Additionally **2013**: local television (RTV1 Nijmegen: news); National radio ([Hoe?Zo!](#)); international ([NY Times](#)), national (*Volkscrant*, *NRC*) and regional (*Gelderlander*) newspapers.
- P.H.J. Kouwer, “New discotic nematic phase” *C2W* **2001**, 23, 7 (Dutch).

OUTREACH:

Regular lectures and activities for:

- **High school students:** e.g. Masterclass “*Chemistry of Love*” (since **2017**); ITN Ambassador’s Day (**2016**, **2018**); 4VWO day (**2015**).
- **Parents** of students Molecular Sciences: “Parent’s Day” (since **2014**).
- **Prospective BSc and MSc students:** Proefstudereren (since **2013**); Open Days and Master Days (since **2012**).
- **High school chemistry teachers:** e.g. Radboud Docentendag **2012**, **2013**, **2019**; Noordhof Chemistry Meeting **2011**, **2012**.
- **General audience:** e.g. Wessel Knoops lecture, **2018**; TA User Meeting, **2015**.