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Chair of Biomimetic Materials
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Qualifications

PhD, PhD, University of Melbourne
1 Jan 1997 → 1 Sept 2001
Award Date: 1 Sept 2001

Bachelor, Bachelor of Science, University of Melbourne
1 Mar 1992 → 31 Dec 1996
Award Date: 31 Dec 1996

Employment

Academic Staff

Chair of Biomimetic Materials
Technische Universität Dresden
1 Jan 2014 → present

Research outputs

Diatom adhesive trail proteins acquired by horizontal gene transfer from bacteria serve as primers for marine biofilm formation

Zackova Suchanova, J., Bilcke, G., Romanowska, B., Fatlawi, A., Pippel, M., Skeffington, A., Schroeder, M., & 4 others
Vyverman, W., Vandepoele, K., Kröger, N. & Poulsen, N., Oct 2023, In: *New Phytologist*. 240, 2, p. 770-783 14 p.

Thalassiosira pseudonana(Cyclotella nana) (Hustedt) Hasle et Heimdal (Bacillariophyceae): A genetically tractable model organism for studying diatom biology, including biological silica formation

Poulsen, N. & Kroeger, N., Oct 2023, In: *Journal of Phycology*. 59, 5, 9 p.

On the role of cell surface associated, mucin-like glycoproteins in the pennate diatom Craspedostauros australis (Bacillariophyceae)

Poulsen, N., Hennig, H., Geyer, V. F., Diez, S., Wetherbee, R., Fitz-Gibbon, S., Pellegrini, M., & 1 others
Kröger, N., 5 Oct 2022, In: *Journal of Phycology*. 2022, 16 p.

Shedding light on silica biomineralization by comparative analysis of the silica-associated proteomes from three diatom species

Skeffington, A. W., Gentzel, M., Ohara, A., Milentyev, A., Heintze, C., Boettcher, L., Goerlich, S., & 3 others
Shevchenko, A., Poulsen, N. & Kroeger, N., Jun 2022, In: *The plant journal*. 110, 6, p. 1700-1716 17 p.

Diatom adhesion and motility

Poulsen, N., Davutoglu, M. G. & Žáčková Suchanová, J., 2022, *The Molecular Life of Diatoms*. Falciatore, A. & Mock, T. (eds.). Springer Nature , p. 367-393 27 p.

Diurnal transcript profiling of the diatom Seminavis robusta reveals adaptations to a benthic lifestyle

Bilcke, G., Osuna-Cruz, C. M., Santana Silva, M., Poulsen, N., D'hondt, S., Bulankova, P., Vyverman, W., & 2 others
De Veylder, L. & Vandepoele, K., Jul 2021, In: *The plant journal*. 107, 1, p. 315-336 22 p.

Mating type specific transcriptomic response to sex inducing pheromone in the pennate diatom Seminavis robusta

Bilcke, G., Van den Berge, K., De Decker, S., Bonneure, E., Poulsen, N., Bulankova, P., Osuna-Cruz, C. M., & 8 others
Dickenson, J., Sabbe, K., Pohnert, G., Vandepoele, K., Mangelinckx, S., Clement, L., De Veylder, L. & Vyverman, W.,
Feb 2021, In: *ISME Journal*. 15, 2, p. 562-576 15 p.

The *Seminavis robusta* genome provides insights into the evolutionary adaptations of benthic diatoms (vol 11, 3320, 2020)
Osuna-Cruz, C. M., Bilcke, G., Vancaester, E., De Decker, S., Bones, A. M., Winge, P., Poulsen, N., & 18 others
Bulankova, P., Verhelst, B., Audoor, S., Belisova, D., Pargana, A., Russo, M., Stock, F., Cirri, E., Brembu, T., Pohnert, G.,
Piganeau, G., Ferrante, M. I., Mock, T., Sterck, L., Sabbe, K., De Veylder, L., Vyverman, W. & Vandepoele, K., 16 Oct
2020, In: Nature communications. 11, 1, 5331.

Genetically Programmed Regioselective Immobilization of Enzymes in Biosilica Microparticles

Kumari, E., Görlich, S., Poulsen, N. & Kröger, N., 18 Jun 2020, In: Advanced functional materials. 30, 25, 13 p., 2000442.

Chitin synthase localization in the diatom *Thalassiosira pseudonana*

Poulsen, N., Wustmann, M., Kröger, N. & Pée, K-H., 2020, In: BMC materials. 2, 10.

Identification of proteins in the adhesive trails of the diatom *Amphora coffeaeformis*

Lachnit, M., Buhmann, M. T., Klemm, J., Kroeger, N. & Poulsen, N., 9 Sept 2019, In: Philosophical Transactions of the
Royal Society B: Biological Sciences. 374, 1784, 9 p., 20190196.

**Biominaleralization as a Paradigm of Directional Solidification: A Physical Model for Molluscan Shell Ultrastructural
Morphogenesis**

Schoeppler, V., Granasy, L., Reich, E., Poulsen, N., de Kloe, R., Cook, P., Rack, A., & 2 othersPusztai, T. & Zlotnikov, I.,
Nov 2018, In: Advanced materials. 30, 45, 1803855.

Establishing super-resolution imaging for proteins in diatom biosilica

Groger, P., Poulsen, N., Klemm, J., Kroger, N. & Schlierf, M., 9 Nov 2016, In: Scientific reports. 6, 8 p., 36824.

**Biochemical Composition and Assembly of Biosilica-associated Insoluble Organic Matrices from the Diatom *Thalassiosira
pseudonana***

Kotzsch, A., Pawolski, D., Milentyev, A., Shevchenko, A., Scheffel, A., Poulsen, N., Shevchenko, A., & 1 othersKroeger, N.,
, 4 Mar 2016, In: Journal of Biological Chemistry. 291, 10, p. 4982-4997 16 p.

Isolation and biochemical characterization of underwater adhesives from diatoms

Poulsen, N., Kröger, N., Harrington, M. J., Brunner, E., Paasch, S. & Buhmann, M. T., Apr 2014, In: Biofouling. 30, 4, p.
513-523 11 p.

NITRATE AND CARBONATE CONCENTRATION FOR HIGH GLUCOSE CONTENT IN MICROALGAE

Kroger, N., Poulsen, N. & Miller, S. J., 30 Jan 2014, IPC (International Patent Classification) C12M 1/00 A I, Patent No.
WO2014018338, Priority date 23 Jul 2012, Priority No. US201213556048

**A Tyrosine-rich Cell Surface Protein in the Diatom *Amphora coffeaeformis* identified through Transcriptome Analysis and
Genetic Transformation**

Buhmann, M. T., Poulsen, N., Klemm, J., Kröger, N. & Kennedy, M. R., 2014, In: PLoS ONE.

Pentalysine clusters mediate silica targeting of silaffins in *Thalassiosira pseudonana*

Poulsen, N., Scheffel, A., Sheppard, V. C. & Kröger, N., 12 Jul 2013, In: Journal of Biological Chemistry. 288, 28, p.
20100-20109 10 p.

Live Diatom Silica Immobilization of Multimeric and Redox-Active Enzymes

Sheppard, V. C., Scheffel, A., Poulsen, N. & Kroeger, N., Jan 2012, In: Applied and environmental microbiology. 78, 1, p.
211-218 9 p.

**A Systematic Screen to Discover and Analyze Apicoplast Proteins Identifies a Conserved and Essential Protein Import
Factor**

Poulsen, N., 1 Dec 2011, In: PLOS pathogens. 7, 12, e1002392.

Nanopatterned protein microrings from a diatom that direct silica morphogenesis

Scheffel, A., Poulsen, N., Shian, S. & Kröger, N., 22 Feb 2011, In: Proceedings of the National Academy of Sciences of
the United States of America : PNAS. 108, 8, p. 3175-3180 6 p.

Characterization of an Endoplasmic Reticulum-associated Silaffin Kinase from the Diatom *Thalassiosira pseudonana*
Sheppard, V., Poulsen, N. & Köger, N., 8 Jan 2010, In: *Journal of Biological Chemistry*. 285, 2, p. 1166-1176 11 p.

Protein-Mediated Layer-by-Layer Syntheses of Freestanding Microscale Titania Structures with Biologically Assembled 3-D Morphologies

Fang, Y., Wu, Q., Dickerson, M. B., Cai, Y., Shian, S., Berrigan, J. D., Poulsen, N., & 2 others Kroeger, N. & Sandhage, K. H., 22 Dec 2009, In: *Chemistry of materials*. 21, 24, p. 5704-5710

Protein-Enabled Synthesis of Monodisperse Titania Nanoparticles On and Within Polyelectrolyte Matrices

Kharlampieva, E., Slocik, J. M., Singamaneni, S., Poulsen, N., Kroeger, N., Naik, R. R. & Tsukruk, V. V., 24 Jul 2009, In: *Advanced functional materials*. 19, 14, p. 2303-2311 9 p.

The Phaeodactylum genome reveals the evolutionary history of diatom genomes

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Bioenabled surface-mediated growth of titania nanoparticles

Kharlampieva, E., Tsukruk, T., Slocik, J. M., Ko, H., Poulsen, N., Naik, R. R., Kröger, N., & 1 others Tsukruk, V. V., 3 Sept 2008, In: *Advanced materials*. 20, 17, p. 3274-3279 5 p.

Biochemistry and Molecular Genetics of Silica Biomineralization in Diatoms

Kröger, N. & Poulsen, N., 20 Mar 2008, *Handbook of Biomineralization: Biological Aspects and Structure Formation*. Wiley-VCH, Weinheim [u. a.], Vol. 1. p. 43-58 16 p.

Diatoms—From Cell Wall Biogenesis to Nanotechnology

Kröger, N. & Poulsen, N., 2008, In: *ANNUAL REVIEW OF GENETICS*. 42, p. 83-107 24 p.

Identification of peptides capable of inducing the formation of titania but not silica via a subtractive bacteriophage display approach

Fang, Y., Poulsen, N., Dickerson, M. B., Cai, Y., Jones, S. E., Naik, R. R., Kröger, N., & 1 others Sandhage, K. H., 2008, In: *Journal of materials chemistry*. 18, 32, p. 3871-3875 5 p.

Silica Immobilization of an Enzyme through Genetic Engineering of the Diatom *Thalassiosira pseudonana*

Poulsen, N., Berne, C., Spain, J. & Kröger, N., 2007, In: *Angewandte Chemie - International Edition*. 46, 11, p. 1875-1878 4 p.

Bioenabled synthesis of rutile (TiO₂) at ambient temperature and neutral pH

Kroger, N., Dickerson, M. B., Ahmad, G., Cai, Y., Haluska, M. S., Sandhage, K. H., Poulsen, N., & 1 others Sheppard, V. C., 2006, In: *Angewandte Chemie - International Edition*. 45, 43, p. 7239-7243

MOLECULAR GENETIC MANIPULATION OF THE DIATOM THALASSIOSIRA PSEUDONANA (BACILLARIOPHYCEAE)

Poulsen, N., Chesley, P. & Kröger, N., 2006, In: *Journal of Phycology*. 42, 5, p. 1059-1065 7 p.

A new molecular tool for transgenic diatoms: Control of mRNA and protein biosynthesis by an inducible promoter-terminator cassette

Poulsen, N. & Kröger, N., Jul 2005, In: *FEBS Journal*. 272, 13, p. 3413-3423 11 p.

Biosilica nanofabrication in diatoms: The structures and properties of regulatory silaffins

Kröger, N. & Poulsen, N., 2005, *Biological and Bio-Inspired Materials and Devices*. Materials Research Society, p. 1-6 6 p. (Materials Research Society Symposium Proceedings, Vol. 873).

Silica morphogenesis by alternative processing of silaffins in the diatom *Thalassiosira pseudonana*

Poulsen, N. & Kröger, N., 8 Oct 2004, In: *Journal of Biological Chemistry*. 279, 41, p. 42993-42999 7 p.

Biosilica formation in diatoms: Characterization of native silaffin-2 and its role in silica morphogenesis

Poulsen, N., Sumper, M. & Kröger, N., 24 Sept 2003, In: *Proceedings of the National Academy of Sciences of the United States of America : PNAS*. 100, 21, p. 12075-12080 6 p.

Diatom gliding is the result of an actin-myosin motility system

Poulsen, N., Spector, I., Spurck, T., Schultz, T. & Wetherbee, R., 1999, In: *Cell Motility and the Cytoskeleton*. 44, 1, p. 23-33 11 p.

Phylogenetic Diversity of Parabasalian Symbionts from Termites, Including the Phylogenetic Position of *Pseudotrypanosoma* and *Trichonympha*

Poulsen, N., Nov 1998, In: *Journal of Eukaryotic Microbiology*. 45, 6, p. 643-650 8 p.

Activities

Diatom Gliding

Poulsen, N. (Speaker)
10 Nov 2022

Journal of Phycology (Journal)

Poulsen, N. (Associate editor)
1 Jan 2022 → ...

The Molecular Life of Diatoms

Mock, T. (Organiser), Poulsen, N. (Organiser), Allen, A. (Organiser), Bones, A. (Organiser), Falciatore, A. (Organiser), Kroth, P. (Organiser), Thamatrakoln, K. (Organiser), Young, J. (Organiser)
14 Jul 2019 → 18 Jul 2019

Understanding the molecular mechanism of diatom underwater adhesion

Poulsen, N. (Speaker)
2019

Trailins: a new protein family in the adhesive trails of diatoms

Poulsen, N. (Speaker), Kröger, N. (Involved person)
9 Jul 2017 → 13 Jul 2017

A Sticky Situation: Unraveling the Secrets of Diatom Adhesion & Motility

Poulsen, N. (Speaker)
6 Mar 2017 → 7 Mar 2017

A sticky situation: understanding the mechanism of diatom adhesion

Poulsen, N. (Speaker), Kröger, N. (Involved person)
20 Jun 2016 → 24 Jun 2016

Isolation and biochemical characterization of underwater adhesives from diatoms

Poulsen, N. (Speaker)
6 Jul 2014 → 10 Jul 2014

Diatoms: Life in a Glasshouse

Poulsen, N. (Speaker)

5 May 2014 → 7 May 2014

Phycologia (Journal)

Poulsen, N. (Associate editor)

1 Jan 2012 → 31 Dec 2014