Curriculum vitae: Pawel Sikorski, 1974-07-24

Gender: Male. Nationality: Polish.
Research ID: A-2304-2009
Research group web page: http://www.ntnu.edu/physics/bionano

Higher education degrees

Ph.D. in Polymer Physics, University of Bristol, UK **2002**
Ph.D. thesis supervisor: Prof. E.D.T. Atkins

M.Sc. in Material Science, with distinction
Wrocław University of Science and Technology, Poland **1998**

Employment history

NTNU, Norwegian University of Science and Technology:

2011–present Professor, Biophysics and Medical Technology, Department of Physics
2005–2011 Associate Professor, Biophysics and Medical Technology, Department of Physics
2004–2005 Post.Doc., Department of Physics/Department of Biotechnology
2002–2004 Post.Doc., Department of Physics

University of Bristol, UK:

2001–2002 Research Associate, Department of Physics

Publications

Total 60. H-index: 25 (Google Scholar). Sum of times cited ≈2700 (Google Scholar). Research ID: A-2304-2009. Google Scholar Profle. Research group web page.

Supervision experience (main supervisor)

Post.Doctoral researchers

2008–2011 Minli Xie. Nanoscale Control of Mineral Deposition within Polysaccharide Gel Networks
2013–2017 David Bassett. Mineralized, hierarchical, bioinspired materials for tissue engineering.
2014–2016 Peter Køllensperger. Marie Curie Intra-European Fellow.

Doctoral students

2006–2010 F. Mumm: Interactions of High Aspect Ratio Nanostructures and Biological Systems.
2007–2011 M. Ø. Olderøy: New composite biomaterials prepared by mineralization of alginate micro-beads.
2011–2015 K.S. Beckwith: Nanostructured devices for cell studies.
2013–2017 S.H. Bjørnøy: Mineralized, hierarchical, bioinspired materials for tissue engineering.
2016–2020 J. Vinje: Nanostructured surfaces for cell-surface interaction studies, cell manipulation and biotechnical applications.

Teaching activities

2007 – present Nano Life Science: Course for Master in Nanotechnology study program at NTNU. The course covers cellular biophysics and many aspects of bionanotechnology, use of micro- and nano-fabrication in cell biology, advanced characterisation methods.
2011 – present Signal processing: 3rd year course for physics and biophysics students.
2007 – 2015 Several smaller modules, including one on applications of FIB-SEM tomography in cell biology and next-generation DNA sequencing.
2007 – 2016 Main supervisor: 9 Master thesis (Master in Nanotechnology, specialisation bionano.)

Institutional responsibilities

2005 – present Involved in establishment of NTNU nanotechnology laboratory (NTNU NanoLab), where I am involved in planning and coordination of research related to bionanotechnology

2012 – present Leader of the study program board for Master in Nanotechnology study program at NTNU. This correspond to a 20% position and involves coordination of all aspect of Master in Nanotechnology education at NTNU.

2005 – present Organized and co-organized several local and national meeting related to nanotechnology research at NTNU and biophysics research in Norway.

2015 – present Member of the leader group of the Strategic Research Areas Health at NTNU, representing the Faculty of Natural Science and Technology.

2015 – present Head of division. Biophysics and Medical Technology. Member of the Department of Physics Leader Group.

commissions of trust

2016 – present The Research Council of Norway. Nanotechnology and Advanced Materials (NANO2021). Programme board member.

Research collaboration network

International:

1. Prof. L.C. Serpell (Sussex Amyloid Protein Group, University of Sussex, UK) (8 publications).
2. Prof. Z. Zhang, Professor of Chemical Engineering, College of Physics Science and Engineering, University of Birmingham, UK (2 publication).
3. Prof. A. Nussler, Unfall- und Wiederherstellungschirurgie, Unfallchirurgische Klinik an der Eberhard Karls Universität Tübingen, Germany
4. Associate. Prof. K. Martinez. Nano-Science Center. University of Copenhagen, Denmark (1 publication).
5. Prof. Pamela Habibović, MERLN Institute for Technology-Inspired Regenerative Medicine, Maastricht University, The Netherlands.
6. Dr. David Bassett & Prof. Liam Grover, School of Chemical Engineering, University of Birmingham, UK

National:

1. Prof. V. G. H. Eijsink (4 publications).
2. Prof. J.P. Andreassen, Department of Chemcal Engineering, NTNU (5 publications).
3. Prof. B.L. Starnd Department of Biotechnology, NTNU (5 publications).
4. Prof. T. Standal, Prof. Astrid Lægreid Department of Cancer Research and Molecular Medicine, Faculty of Medicine, NTNU (1 publication).
5. Prof. Ø. Halaas. Department of Cancer Research and Molecular Medicine, Faculty of Medicine, NTNU. Nanomedicine, application of FIB/SEM tomography in cell biology research (collaboration on 2 Master thesis projects, 1 publication).
6. Prof. J.E. Brinchmann. Norwegian Center for Stem Cell Research. Cell therapy research group at the Institute of Immunology, Rikshospitalet. Oslo. Norway (1 publication).
7. Dr. Anja Røyne. Department of Physics, University of Oslo
8. Dr. Alexander Wentzel. SINTEF Materials and Chemistry.

Refereeing and related activities

- Scientific reviewer for journals such as ACS Nano, Macromolecular Bioscience, Biomacromolecules, Macromolecules, Small.
- Administrator of 3 PhD thesis defence committees. Member of evaluation committee for 2 PhD thesis, University of Copenhagen, Denmark

Funding ID

2007-2011 PI of the Norwegian Research Council grant "Nanoscale Control of Mineral Deposition within Polysaccharide Gel Networks". Budget €0.57M, funding for 1 PhD, 1 Post. Doc; collaboration with 3 research groups at NTNU and 2 international research groups.

2013-2017 PI of the Norwegian Research Council grant "Mineralized, hierarchical, bioinspired materials for tissue engineering". €1.3M. Funding for 2 PhD, 1 Post. Doc; collaboration with 3 research groups at NTNU and 2 international research groups.

2017-2021 co-applicatnt, Norwegian Research Council grant "Systems analysis and fundamental control of bacterial processes in the production of bio-concrete for construction purposes (BioZEment 2.0)". BIOTEK2021 Centre for Digital Life Norway. Funding for 1 PhD in my group.

2005-2016 Several small internal university grants (3 PhD scholarships, equipment and laboratory access)

Research Record:

1998 – Polymer physics and structural studies of crystalline polymers and biopolymers (12 publications during PhD work, 21 in total). Determined the structure and describe organization of several polymer and biopolymer systems, including model systems related to amyloid formation. Based on fiber diffraction data, discovered organization and mode of association involved in formation of poly-glutamine amyloid fibrils, structure which since have been confirmed by theoretical and single crystal diffraction investigations.

1. (9.7[a], 476[b]) O. S. Makin, E. Atkins, **P. Sikorski**, J. Johansson, and L. C. Serpell. Molecular basis for amyloid fibril formation and stability. *Proc. Natl. Acad. Sci. U. S. A.*, 102(2):315–320, 2005.
2. (13.5, 6) K. L. Morris, S. Zibaee, L. Chen, M. Goedert, **P. Sikorski**, L.C. Serpell. The Structure of Cross-β Tapes and Tubes Formed by an Octapeptide, $\alpha S\beta 1$. Angew. Chem. Int. Ed. 2013. doi: 10.1002/anie.201207699
3. (5.5, 200) **P. Sikorski**, F. Mo, G. Skjak-Braek, and B. T. Stokke.Evidence for egg-box-compatible interactions in calcium-alginate gels from fiber X-ray diffraction. *Biomacromolecules*, 8(7):2098–2103, 2007.
4. (5.5, 60) **P. Sikorski**, R. Hori, and M. Wada. Revisit of alpha-chitin crystal structure using high resolution X-ray diffraction data. *Biomacromolecules*, 10(5):1100–1105, 2009.
5. (5.5, 148) **P. Sikorski** and E. Atkins. New model for crystalline polyglutamine assemblies and their connection with amyloid fibrils. *Biomacromolecules*, 6(1):425–432, 2005.
6. (6.4, 118) **P. Sikorski**, E. D. T. Atkins, and L. C. Serpell. Structure and texture of fibrous crystals formed by alzheimer's a beta(11-25) peptide fragment. *Structure*, 11(8):915–926, 2003.

2002 – Biomaterials and biomineralizatio (17 publications). Research focusing on understanding and developing methods to make organic/inorganic composite materials based on hydrogels and calcium carbonate and calcium phosphate utilizing a broad range of physical characterization methods. Obtained important insight into influence of biopolymers on biomineralisation process, as well as developed a range of well characterized composite materials.

1. (3.7, 5) SH Bjørnøy, DC Bassett, S Ucar, JP Andreassen, **P Sikorski**. Controlled mineralisation and recrystallisation of brushite within alginate hydrogels. Biomedical Materials 11 (1), 015013. 2016
2. (4.8, 2) D.C. Bassett, A.G. Håti, T.B. Melø, B.T. Stokke, **P. Sikorski**. Competitive ligand exchange of crosslinking ions for ionotropic hydrogel formation. Journal of Materials Chemistry B 4 (37), 6175-6182. 2016.
3. (5.6, 2) A.G. Håti, D.C. Bassett, J.M. Ribe, **P Sikorski**, D.A. Weitz, B.T. Stokke. Versatile, cell and chip friendly method to gel alginate in microfluidic devices. Lab on a Chip 16 (19), 3718-3727. 2016

[a] Journal Impact Factor

[b] Citations according to Google Scholar. Feb 2017

4. (6.0, 1) S.H. Bjørnøy, S. Mandaric, D.C. Bassett, A.K.O. Åslund, S. Ucar, J-P. Andreassen, B. L. Strand, **Pawel Sikorski**. Gelling kinetics and in situ mineralization of alginate hydrogels: A correlative spatiotemporal characterization toolbox. Acta Biomaterialia 44, 243-253
5. (6.0, 1) S.H. Bjørnøy, D. C. Bassett, S. Ucar, B. L. Strand, J-P. Andreassen, **Pawel Sikorski**. A correlative spatiotemporal microscale study of calcium phosphate formation and transformation within an alginate hydrogel matrix. Acta Biomaterialia 44, 254-266
6. (4.7, 6) S Ucar, SH Bjørnøy, DC Bassett, BL Strand, **P Sikorski**, JP Andreassen. Nucleation and Growth of Brushite in the Presence of Alginate. Crystal Growth & Design 15 (11), 5397-5405
7. (3.5, 18) M. Westhrin, M. Xie, M.Ø. Olderøy, **P. Sikorski**, B.L. Strand, T. Standal. Osteogenic Differentiation of Human Mesenchymal Stem Cells in Mineralized Alginate Matrices. PLOS One 2015.
8. (2.9, 3) D.C. Bassett, I. Madzovska, K.S. Beckwith, T.B. Melø, B. Obradovic, **P. Sikorski**. Dissolution of copper mineral phases in biological fluids and the controlled release of copper ions from mineralized alginate hydrogels. Biomed. Mater. 10 015006. 2015.
9. (3.5,21) M.O. Olderoy, M.B. Lilledahl, M.S. Beckwith, et al. Biochemical and Structural Characterization of Neocartilage Formed by Mesenchymal Stem Cells in Alginate Hydrogels. Plos One Volume: 9, 3, 2014.
10. (2.6,10) M. Xie, M.O. Olderoy, Z. Zhang, J.P. Andreassen, B.L. Strand, **P. Sikorski**. Biocomposites prepared by alkaline phosphatase mediated mineralization of alginate microbeads. RCS Advances, 2012, 2, 1457-1465
11. (6.0, 49) M Xie, MØ Olderøy, JP Andreassen, SM Selbach, BL Strand, **P. Sikorski**. Alginate-controlled formation of nanoscale calcium carbonate and hydroxyapatite mineral phase within hydrogel networks. *Acta Biomaterialia*, 6(9):3665–3675, 2010.
12. (4.7, 16) M. O. Olderoy, M. L. Xie, B. L. Strand, K. I. Draget, **P. Sikorski**, and J. P. Andreassen. Polymorph switching in the calcium carbonate system by well-defined alginate oligomers. *Cryst. Growth Des.*, 11(2):520–529, 2011.
13. (4.7, 35) M. O. Olderoy, M. L. Xie, B. L. Strand, E. M. Flaten, **P. Sikorski**, and J. P. Andreassen. Growth and nucleation of calcium carbonate vaterite crystals in presence of alginate. *Cryst. Growth Des.*, 9(12):5176–5183, 2009.
14. (9.7, 182) S. J. Horn, **P. Sikorski**, J. B. Cederkvist, G. Vaaje-Kolstad, M. Sorlie, B. Synstad, G. Vriend, K. M. Varum, and V. G. H. Eijsink. Costs and benefits of processivity in enzymatic degradation of recalcitrant polysaccharides. *Proc. Natl. Acad. Sci. U. S. A.*, 103(48):18089–18094, 2006.

2005 – Bionanotechnology (7 publications, 1 in preparation). Main focus on understanding interactions between cells and high aspect ratio nanostructures. Application of micro and nano-fabrication methods and focus on model systems which can easily be integrated with standard cell biology work flow.

1. (3.5,2) M.S. Beckwith, K.S. Beckwith, **P. Sikorski**, T.H. Flo, and Ø. Halaas. Seeing a mycobacterium-infection in nanoscale 3D: Correlative imaging by light microscopy and FIB/SEM tomography. PloS One 10 (9), e0134644 (2015).
2. (6.7,6) K.S. Beckwith, S.P. Cooil, J.W. Wells, **P. Sikorski**. Tunable High Aspect Ratio Polymer Nanostructures for Cell Interfaces. Nanoscale 2015.
3. (8.3, 27) F. Mumm, K.M. Beckwith, S. Bonde, K.L. Martinez, and **P. Sikorski**. A Transparent Nanowire-Based Cell Impalement Device Suitable for Detailed Cell-Nanowire Interaction Studies. Small 2013, 9, 263-72.
4. (3.7, 7) K.M. Beckwith and **P. Sikorski**. Patterned cell arrays and patterned co-cultures on polydopamine-modified poly(vinyl alcohol) hydrogels. Biofabrication 2013, 5 045009
5. (4.0, 29) F. Mumm and **P. Sikorski**. Oxidative fabrication of patterned, large, non-flaking CuO nanowire arrays. *Nanotechnology*, 22(10):105605, 2011.
6. (11.4, 91) F. Mumm, A. T. J. van Helvoort, and **P. Sikorski**. Easy route to superhydrophobic copper-based wire-guided droplet microfluidic systems. *Acs Nano*, 3(9):2647–2652, 2009.