



PAUL JOZEF MATHEUS SMEETS, PhD
Research Assistant Professor, TEM & FIB Facility Manager
Materials Science and Engineering
2145 Sheridan Rd., Technological Institute AG96
Evanston, IL 60208, USA
Tel: +1-847-491-7807
Email: paul.smeets@northwestern.edu



CURRICULUM VITAE

EDUCATION

- PhD in Molecular Systems and Materials Chemistry** **2011-2016**
Eindhoven University of Technology, the Netherlands
- ❖ Dissertation: Towards understanding pathway complexity in calcium carbonate mineralization
 - ❖ Awarded the *Piet Bennema Award for Crystal Growth*
- MSc in Chemical Engineering** **2008-2011**
Eindhoven University of Technology, the Netherlands
- ❖ Dissertation: A Detailed Investigation on Calcium Carbonate Precipitation (grade: 8.5/10)
- BSc in Chemical Engineering** **2004-2008**
Eindhoven University of Technology, the Netherlands
- ❖ Minor in business economics

PROFESSIONAL EXPERIENCE

- Northwestern University, Evanston IL, USA** **2022-present**
Research Assistant Professor; NUANCE Center
- Northwestern University, Evanston IL, USA** **2019-2022**
Research Associate; NUANCE Center
- ❖ Implementation, development, training & operations of electron microscopy in the EPIC facility
 - Managed integration of the JEOL 4700F FIB-SEM (collaboration with JEOL USA)
 - Acquired new instrumentation through proposals & collaborations
 - Co-coordinated installation of a JEOL 3200FS Cryo-TEM
 - ❖ Organization of outreach events: tours, tech talks, live (virtual) demos, and other scholarly activities
 - ❖ Internal NU and external research collaborations requiring FIB-SEM and/or (S)TEM characterization
 - Numerous publications as a result of collaboration with various NU research groups
 - ❖ Research: Assessing the Structure-Property Relationship in Enamel at the nano- through atomic scale using advanced scanning TEM techniques
- Northwestern University, Evanston IL, USA** **2016-2019** **wweew**
Postdoctoral Research Fellow; Advisor: Dr. Derk Joester
- ❖ Low dose aberration-corrected cryo-STEM to image human enamel at the atomic scale
 - ❖ Quantitatively characterized impurities using EDS/EELS and Atom Probe Tomography
 - ❖ *Microscopy & Microanalysis Postdoctoral Scholar Award 2018 & 2019*
- Eindhoven University of Technology, Eindhoven, The Netherlands** **2013-2016**
Graduate Researcher (PhD); Advisor: Dr. James J. De Yoreo
- ❖ Characterization of CaCO₃ biomimetic nucleation & growth processes using liquid phase TEM
 - ❖ Used *in situ* AFM to visualize crystal growth processes by particle assembly
- Eindhoven University of Technology, Eindhoven, The Netherlands** **2008-2011**
Graduate Researcher (MSc); Advisor: Prof. Nico A.J.M. Sommerdijk
- ❖ Imaged/analyzed liquid-liquid phase separated CaCO₃ droplets for the first time in cryo-TEM
 - ❖ Inferred hydration level of droplets based on contrast and simulations

RELATED EXPERIENCE

Research Internship

2011

DSM Ahead, Geleen, the Netherlands

- ❖ Four-month project: Templates for silica layer deposition without the use of free dissolved poly-electrolytes under supervision of Dr. Mark Boerakker
- ❖ Design of polymeric core micelles from triblock copolymers with an outer silica shell for drug delivery/coating purposes
- ❖ Final grade 9.0/10

SKILLS

(Scanning) Transmission Electron Microscopy

2008-present

- ❖ Proficient with both Thermo Fisher (Tecnai, Titan) and JEOL (2100F, 3200FS, ARM200F, ARM300F) microscopes
- ❖ Imaging techniques: Low dose (cryo-) (S)TEM imaging / aberration-corrected (S)TEM imaging (HAADF, LAADF, BF, ABF) / Liquid cell TEM
- ❖ Diffraction techniques: Electron diffraction / 4D-STEM / familiar with differential phase contrast (DPC) / familiar with Micro-ED
- ❖ Analytical techniques: Electron Energy Loss Spectroscopy and Energy Dispersive X-Ray Spectroscopy
- ❖ Proficient with various *in situ* holders: cooling (liquid Nitrogen), liquid cell, heating
- ❖ Analysis techniques: Familiar with image (FFT) filtering, imaging/diffraction simulations, strain mapping with geometric phase analysis (GPA), principal component analysis (PCA), etc.
- ❖ Familiar with Matlab/Python coding

Focused Ion Beam - Scanning Electron Microscopy

2016-present

- ❖ Secondary Electron Imaging / Backscattered Electron Imaging
- ❖ Energy Dispersive X-Ray Spectroscopy
- ❖ Familiar with Electron Backscatter Diffraction and Transmission Kikuchi Diffraction
- ❖ Conventional sample preparation (TEM lamellae and APT Nanotips)
- ❖ Advanced sample preparation: TEM lamellae for biasing chips, μ -CT sample preparation
- ❖ Micromachining and nanomanipulation (Kleindiek system)
- ❖ (EDS) FIB Tomography data acquisition
- ❖ Familiar with FIB Tomography data analysis (Dragonfly, Avizo software)

Atomic Force Microscopy

2011-2013

- ❖ *in situ* AFM under continuous and stopped flow conditions
- ❖ Tapping mode and contact mode

Atom Probe Tomography

2017-present

- ❖ Laser-assisted APT
- ❖ 3D reconstruction using CAMECA IVAS software

Infrared and Raman Spectroscopy

2009-present

Sample preparation

2008-present

- ❖ Vitrification of cryo-TEM samples (Vitrobot Mark III)
- ❖ Wedge-polishing SEM/TEM samples
- ❖ Broad-beam Ion beam milling
- ❖ Nanomill low kV argon polishing
- ❖ Conductive coating of samples

HONORS AND AWARDS

- ❖ **Microscopy and Microanalysis Postdoctoral Scholar Award** 2018 & 2019
Sponsored by the Microscopy Society of America (MSA)
- ❖ **KNCV Piet Bennema Award for Crystal Growth** 2018
Awarded every three years to the author of an outstanding dissertation or other scientific publications in the field of crystal growth, for work done at a Dutch university or company
- ❖ **Materials Research Society Travel Award** 2012
- ❖ **12th International Conference on the Chemistry and Biology of Mineralized Tissues Travel Award** 2017
- ❖ **Northwestern University Postdoctoral Professional Development Travel Award** 2017

PEER-REVIEWED PUBLICATIONS

First (co-)author publications in amongst others: *Nature*, *Nature Materials*, *Proceedings of the National Academy of Sciences*

2023

- 1) Koo, K.; Shen, B.; Baik, S.-I.; Mao, Z.; **Smeets, P. J. M.**; Cheuk, I.; He, K.; Dos Reis, R.; Huang, L.; Ye, Z., Formation mechanism of high-index faceted Pt-Bi alloy nanoparticles by evaporation-induced growth from metal salts. *Nature Communications* (2023), 14 (1), 3790.

2022

- 2) San, X.; Gong, M.; Wang, J.; Ma, X.; Dos Reis, R.; **Smeets, P. J. M.**; Dravid, V. P.; Hu, X., Uncovering the crystal defects within aragonite CaCO₃. *Proceedings of the National Academy of Sciences* (2022), 119 (14), e2122218119.
- 3) Koo, K.; Ribet, S. M.; Zhang, C.; **Smeets, P. J. M.**; Dos Reis, R.; Hu, X.; Dravid, V. P., Effects of the encapsulation membrane in operando scanning transmission electron microscopy. *Nano Letters* (2022), 22 (10), 4137-4144.

2021

- 4) Stegbauer, L.; **Smeets, P. J. M.**; Free, R.; Wallace, S. G.; Hersam, M. C.; Alp, E. E.; Joester, D., Persistent polymorphism in the chiton tooth: From a new biomineral to inks for additive manufacturing. *Proceedings of the National Academy of Sciences* (2021), 118 (23), e2020160118.
- 5) Hu, Z.; Bradshaw, N. P.; Vanthournout, B.; Forman, C.; Gnanasekaran, K.; Thompson, M. P.; **Smeets, P. J. M.**; Dhinojwala, A.; Shawkey, M. D.; Hersam, M. C., Non-iridescent structural color control via inkjet printing of self-assembled synthetic melanin nanoparticles. *Chemistry of Materials* (2021), 33 (16), 6433-6442.
- 6) He, K.; Kim, K.; Villa, C. J.; Ribet, S. M.; **Smeets, P. J. M.**; Dos Reis, R.; Voorhees, P. W.; Hu, X.; Dravid, V. P., Degeneration behavior of Cu nanowires under carbon dioxide environment: An in situ/operando study. *Nano Letters* (2021), 21 (16), 6813-6819.
- 7) Deng, S.; Zhang, B.; Choo, P.; **Smeets, P. J. M.**; Odom, T. W., Plasmonic Photoelectrocatalysis in Copper-Platinum Core-Shell Nanoparticle Lattices. *Nano Letters* (2021), 21 (3), 1523-1529.
- 8) Chang, A. S.; Li, B.; Wang, S.; Nami, M.; **Smeets, P. J. M.**; Han, J.; Lauhon, L. J., Selective area regrowth produces nonuniform Mg doping profiles in nonplanar GaN p-n junctions. *ACS Applied Electronic Materials* (2021), 3 (2), 704-710.

2020

- 9) Gnanasekaran, K.; Chang, H.; **Smeets, P. J. M.**; Korpany, J.; Geiger, F. M.; Gianneschi, N. C., In situ Ni²⁺ stain for liposome imaging by liquid-cell transmission electron microscopy. *Nano Letters* (2020), 20 (6), 4292-4297.
- 10) DeRocher, K. A.*; **Smeets, P. J. M.***; Goodge, B. H.; Zachman, M. J.; Balachandran, P. V.; Stegbauer, L.; Cohen, M. J.; Gordon, L. M.; Rondinelli, J. M.; Kourkoutis, L. F., Chemical gradients in human enamel crystallites. *Nature* 2020, 583 (7814), 66-71. *equal contributions

- 11) Deng, S.; Li, R.; Park, J.-E.; Guan, J.; Choo, P.; Hu, J.; **Smeets, P. J. M.**; Odom, T. W., Ultranarrow plasmon resonances from annealed nanoparticle lattices. *Proceedings of the National Academy of Sciences* (2020), 117 (38), 23380-23384.
- 12) Beline, T.; de Almeida, A. B.; Neto, N. F. A.; Matos, A. O.; Ricomini-Filho, A. P.; Sukotjo, C.; **Smeets, P. J. M.**; da Silva, J. H.; Nociti Jr, F. H.; Barão, V. A., β -Ta₂O₅ thin film for implant surface modification triggers superior anti-corrosion performance and cytocompatibility of titanium. *Applied Surface Science* (2020), 520, 146326.

2019

- 13) Olding, J. N.; Henning, A.; Dong, J. T.; Zhou, Q.; Moody, M. J.; **Smeets, P. J. M.**; Darancet, P.; Weiss, E. A.; Lauhon, L. J., Charge separation in epitaxial SnS/MoS₂ vertical heterojunctions grown by low-temperature pulsed MOCVD. *ACS Applied Materials & Interfaces* (2019), 11 (43), 40543-40550.

2017

- 14) Whittaker, M. L.; **Smeets, P. J. M.**; Asayesh-Ardakani, H.; Shahbazian-Yassar, R.; Joester, D., Multi-Step Crystallization of Barium Carbonate: Rapid Interconversion of Amorphous and Crystalline Precursors. *Angewandte Chemie* (2017), 129 (50), 16244-16247.
- 15) **Smeets, P. J. M.**; Finney, A. R.; Habraken, W. J.; Nudelman, F.; Friedrich, H.; Laven, J.; De Yoreo, J. J.; Rodger, P. M.; Sommerdijk, N. A., A classical view on nonclassical nucleation. *Proceedings of the National Academy of Sciences* (2017), 114 (38), E7882-E7890.
- 16) **Smeets, P. J. M.**; Cho, K. R.; Sommerdijk, N. A.; De Yoreo, J. J., A Mesocrystal-Like Morphology Formed by Classical Polymer-Mediated Crystal Growth. *Advanced Functional Materials* (2017), 27 (40), 1701658.

2016

- 17) Kim, Y. Y.; Semsarilar, M.; Carloni, J. D.; Cho, K. R.; Kulak, A. N.; Polishchuk, I.; Hendley IV, C. T.; **Smeets, P. J. M.**; Fielding, L. A.; Pokroy, B., Structure and properties of nanocomposites formed by the occlusion of block copolymer worms and vesicles within calcite crystals. *Advanced Functional Materials* (2016), 26 (9), 1382-1392.

2015

- 18) **Smeets, P. J. M.**; Cho, K. R.; Kempen, R. G.; Sommerdijk, N. A.; De Yoreo, J. J., Calcium carbonate nucleation driven by ion binding in a biomimetic matrix revealed by in situ electron microscopy. *Nature materials* (2015), 14 (4), 394-399 (**Highly cited paper** on Web of Science 2016).

CONFERENCE PRESENTATIONS & POSTERS

Oral & Poster Presentations at various (inter)national conferences

P. J. M. Smeets, X. Hu, V. P. Dravid. Elucidating the Role of Nanoscale Organics in Natural Nanocomposite Materials (**poster presentation**). Microscopy and Microanalysis 2023, Minneapolis, MN, USA, session P10.P2, 25 jul 2023.

Invited Talk: P. J. M. Smeets, S. M. Ribet, R. dos Reis, D. Joester. Making the most out of your ions and electrons: Sample preparation of mineralized tissues with unique shapes and their characterization using advanced STEM techniques. (cryo)FIB/SEM across the disciplines, workshop at University of Illinois Chicago, Chicago, IL, USA, 22 mar 2023.

P. J. M. Smeets, R. dos Reis, A. Pakzad, D. Joester. Assessing the Structure-Property Relationship in Enamel at the Nanoscale Using 4D-STEM (**oral presentation**). Microscopy and Microanalysis 2020, *virtual conference*, session A02.5, 5 aug 2020.

P. J. M. Smeets, K. DeRocher, M. J. Zachman, B. H. Goodge, L. F. Kourkoutis, D. Joester, Human Enamel Crystallites Exhibit a Core-Shell Architecture (**oral presentation**). International Association for Dental Research, Vancouver, Canada, session Mineralized Tissue II: Amelogenesis, 22 jun 2019.

P. J. M. Smeets, K. DeRocher, M. J. Zachman, B. H. Goodge, L. F. Kourkoutis, D. Joester. Atomic Resolution STEM Imaging of Human Enamel Crystallites and Characterization of its Localized Impurities (**oral presentation**). Microscopy and Microanalysis 2018, Baltimore, MD, USA, session B04.2, 7 aug 2018.

P. J. M. Smeets, D. Joester. Assessing Enamel Remineralization at the Nanoscale - an *in vitro* Platform (**poster presentation**). American Association for Dental Research, Fort Lauderdale, FL, USA, session Mineralized Tissue IV, 7 24 mar 2018.

P. J. M. Smeets, D. Joester. Assessing Enamel Remineralization at the Nanoscale - an *in vitro* Platform (**poster presentation**). Gordon Research Seminar & Conference on Biomineralization, New London, NH, USA, poster session 29 jul 2018 – 31 jul 2018.

P. J. M. Smeets, K. DeRocher, D. Joester, Assessing Enamel Remineralization at the Nanoscale - an *in vitro* Platform (**poster presentation**), American Association for Dental Research, Fort Lauderdale, FL, USA, poster session 24 mar 2018.

P. J. M. Smeets, D. Joester, Artificial remineralization of enamel using magnesium and fluoride-rich solutions (**poster presentation**), Gordon Research Conference on Crystal Growth & Assembly, Biddeford, ME, USA, oral presentation 30 jun 2015, poster session 28 jun 2017 – 29 jun 2017.

P. J. M. Smeets, D. Joester, Artificial remineralization of enamel using magnesium and fluoride-rich solutions (**oral and poster presentation**), 12th International Conference on the Chemistry and Biology of Mineralized Tissues (ICCBMT), Kongresshotel Potsdam, Potsdam, Germany, oral presentation 29 may 2017, poster session 29 may 2017 – 31 may 2017.

P. J. M. Smeets, A. R. Finney, W. J. E. M. Habraken, F. Nudelman, H. Friedrich, J. Laven, J. J. De Yoreo, P. M. Rodger and N. A. J. M. Sommerdijk, Calcium Carbonate Prenucleation Species: Clusters or Complexes? (poster presentation), Gordon Research Conference on Biomineralization, PGA Catalunya Business and Convention Centre, Girona, Spain, poster session 15 aug 2016 – 16 aug 2016.

P. J. M. Smeets, R. G. E. Kempen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo. Liquid TEM Reveals Nucleation of CaCO₃ in a Biomimetic Polyelectrolyte Matrix (**oral and poster presentation**). Gordon Research Conference on Crystal Growth & Assembly, Biddeford, ME, USA, oral presentation 30 jun 2015, poster session 1 jul 2015 – 2 jul 2015.

P. J. M. Smeets, R. G. E. Kempen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo, In-situ TEM Shows Ion Binding Is Key to Directing CaCO₃ Nucleation in a Biomimetic Matrix (**oral presentation**), NVvM materials 2014, Utrecht, Nederland, TEM session, 2 dec 2014.

P. J. M. Smeets, R. G. E. Kempen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo. In-situ TEM Shows Ion Binding Is Key to Directing CaCO₃ Nucleation in a Biomimetic Matrix (**oral presentation**). Conference on In-Situ and Correlative Electron Microscopy (CISCeM), Saarbrücken, Germany, session: In-situ observations of biomineralization processes, 14 oct 2014.

P. J. M. Smeets, R. G. E. Kempen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo, Liquid TEM Reveals Nucleation of CaCO₃ in Biomimetic Polyelectrolyte Matrix (**poster presentation**), Gordon Research Conference on Biomineralization, New London, NH, USA, poster session 17 aug 2014 – 22 aug 2014.

P. J. M. Smeets, K. R. Cho, M. H. Nielsen, N.A.J.M. Sommerdijk, J. J. De Yoreo. Real time formation and in-depth analysis of poly(styrenesulfonate) globules by liquid TEM/AFM (**poster presentation**). Dutch Polymer Days, Lunteren, Netherlands, 17 mar 2014.

P. J. M. Smeets, W. J. E. Habraken, F. Nudelman, N. A. J. M. Sommerdijk. The Discovery and Role of Non-Stoichiometric Complexes of Calcium Carbonate in the Solution Precipitation of Vaterite (**oral presentation**), Goldschmidt Conference 2013, Florence, Italy, session 22j, 27 aug 2013.

P. J. M. Smeets, D. Li, M. H. Nielsen, K.R. Cho, N.A.J.M. Sommerdijk, J.J. De Yoreo. Unraveling the CaCO₃-PSS Mesocrystal Formation Mechanism by in situ TEM and in situ AFM (**oral presentation**). Goldschmidt Conference 2013, Florence, Italy, session 10f, 26 aug 2013.

P. J. M. Smeets, D. Li, M. H. Nielsen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo. Unraveling the CaCO₃ Mesocrystal Formation Including a Polyelectrolyte Additive using In-Situ TEM and In-Situ AFM (**poster presentation**). Materials Research Society Fall 2012, Boston, MA, USA, Session SS3, 26 nov 2012.

P. J. M. Smeets, D. Li, M. H. Nielsen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo, Unraveling the CaCO₃ Mesocrystal Formation Including a Polyelectrolyte Additive using In-Situ TEM and In-Situ AFM (**poster presentation**), 2012 Annual Users' Meeting of The Molecular Foundry and NCEM, Berkeley, CA, USA, poster session, 4 oct 2012.

P. J. M. Smeets, D. Li, M. H. Nielsen, K. R. Cho, N. A. J. M. Sommerdijk, J. J. De Yoreo, Unraveling the CaCO₃ Mesocrystal Formation Including a Polyelectrolyte Additive using In-Situ TEM and In-Situ AFM (**oral presentation**), Conference on In-Situ and Correlative Electron Microscopy (CISCeM), Saarbrücken, Germany, session: Imaging Growth of Nanomaterials in Liquid, jul 11 2012.

P. J. M. Smeets; W. J. E. Habraken; F. Nudelman; N. A. J. M. Sommerdijk, Pre-Nucleation Species in Calcium Carbonate Solution Precipitation: Clusters or Complexes? (**oral presentation**), The 23rd Conference on Crystal Growth and Epitaxy - West, Fallen Leaf Lake, CA, USA, Biomaterials Growth and Processes - Section I, jun 6 2012.

P. J. M. Smeets; W. J. E. Habraken; F. Nudelman; N. A. J. M. Sommerdijk, A Detailed Investigation of Calcium Carbonate Solution Precipitation: Clusters Dictate the Pre- and Post-Nucleation Stages (oral presentation), Materials Research Society Spring 2012, San Francisco, CA, USA, Session SS3: CaCO₃ Systems, 11 apr 2012.

RESEARCH AND FACILITY PROPOSALS

Office of Research Core Facilities Proposals granted:

- ❖ Acquisition of an *in-situ* plasma cleaner for TEM equipment.
Title: "An *in-situ* Plasma De-contaminator to enable optimum (S)TEM instrument performance", (2022).
- ❖ Acquisition of a Stela™ Hybrid-Pixel Detector for 4D-STEM Analysis.
Title: "The Stela hybrid-pixel camera for multimode acquisition of electron scattering at low voltage", (2021).
- ❖ Acquisition of an energy dispersive spectroscopy (EDS) detector.
Title: "Large area Silicon Drift Detector for Determining the Chemical Composition of Materials on the Helios Nanolab 600 FIB-SEM", (2021).

P. J. M. Smeets, D. Joester. Assessing Enamel Remineralization at the Nanoscale - an *in vitro* Platform. Center for Nanoscale Materials (CNM) Argonne User Proposal 59145 (2018).

P. J. M. Smeets, D. Joester. Local Nanoscale Impurities Define Solubility of Human Tooth Enamel Crystallites. Cornell University, PARADIM User Proposal #131-A (2017).

P. J. M. Smeets, N. A. J. M. Sommerdijk. Investigation on the CaCO₃ Mesocrystal Formation Process using *in situ* TEM and *in situ* AFM. Molecular Foundry at LBNL, Berkeley, USA, Proposal #1655, (2012-2013).

CONTRIBUTIONS TO MATERIALS SCIENCE

Collaborations

Northwestern University, USA

- ❖ Internal: 10+ co-authored publications across six NU MSE research groups on various research topics
- ❖ Internal: co-PI on NIH R01 proposal ("A Multi-scale Computational Model of Enamel Dissolution" PIs Joester, Rondinelli, Voorhees, Koo). Largely contributed to two NSF-MRI proposals for acquisition of (P)FIB instrumentation (PIs Dravid *et al.*), of which one was successfully granted (award # 2320773)
- ❖ External: Chicago Field Museum (meteorite and fossil sample characterization), Caltech (characterization of early solar system condensates), Florida Atlantic University (characterization of biominerals, e.g. corals)

Facilitating Research & Curriculum Development

Northwestern University, USA & Eindhoven University of Technology, the Netherlands

- ❖ Use core strength in (S)TEM & FIB-SEM to advance materials research at NU
- ❖ Provided (completely virtual) (S)TEM & FIB trainings for 150+ users, mostly NU MSE students
- ❖ Provided technical leadership to the Joester and Dravid research group
- ❖ (In)directly responsible for various (S)TEM and FIB-SEM instrumentation hard- and/or software upgrades or installations at the NUANCE Center aiding materials science research:
 - Gatan Stela Hybrid-Pixel detector for 4D-STEM analysis (2021; co-author of OR grant proposal), Gatan K3 IS direct electron detector (contributed data in NIH proposal #1S10OD026871-01), SerialEM software for low-dose image acquisition, Gatan Latitude-D for Micro-ED acquisition
 - FIB-SEM: 100 mm² solid state EDS detector with AZTec software
- ❖ Assisted in curriculum development - e.g. TEM sample preparation using FIB for MSE360 and MSE466
- ❖ Teaching assistant at NU - prepared and gave two lectures for 35 students on behalf of Dr. Derk Joester for the course Materials Science Principles (part of MSE BSc/MSc) in Spring 2017
- ❖ Teaching assistant at Eindhoven University of Technology - prepared and gave six lectures to 55 students on behalf of Prof. Sommerdijk for the course Physical Chemistry of Soft Matter (part of the Polymers and Composites Master program), discussed assignments, and corrected final examination, in Winter 2014)

Outreach

Northwestern University, USA

- ❖ Co-organized webinar on scanning electron diffraction with vendor (over 500 participants world-wide)
 - set-up the JEOL ARM300F microscope for 4D-STEM live demo
 - aided in putting together the scientific program
- ❖ Co-organized the regional Midwest Microscopy and Microanalysis (M³S) meeting (2021 & 2023)
 - discussion leader and day coordinator
 - aided in putting together the scientific program by contacting and keeping in touch with speakers
- ❖ Organized a SerialEM workshop with JEOL USA for 25 microscope users
- ❖ Developed a project for a SHyNE REU student (2021): "Revealing the Effects of Enamel Dissolution with FIB-SEM Tomography". The student successfully obtained 3D data revealing larger surface porosity in eroded enamel near the surface at the nanoscale
- ❖ Represented the EPIC TEM/FIB facility on numerous occasions in relevant NUANCE events and beyond with tours for (inter)national students, researchers and other guests (e.g. Chicago Field Museum)

MEMBERSHIPS

- ❖ Member of Microscopy Society of America (MSA)
- ❖ Member of Midwest Microscopy and Microanalysis Society (M³S)

OTHER PROFESSIONAL SERVICE

- ❖ Served as chair of the Biomineralization Gordon Research Seminar, 28-29th of July (2018) at Colby-Sawyer College, New London, NH, USA.
- ❖ Served as symposium session chair (P10) of the Microscopy and Microanalysis conference, 27th of July (2023) in Minneapolis, MN, USA.
- ❖ Reviewer for multiple scientific journals: *Nature*, *Nature Communications*, *Ultramicroscopy*, *ACS Applied Bio Materials*, *Crystal Growth & Design*, and *Materials Today Communications*