

Assistant Professor

Department of Chemistry, Faculty of Science, Bilkent University &

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Education & Previous Academic Positions

- 05.2015 – 08.2019 **Post-doctoral Researcher**, *Probing molecular structures of interfacial and bulk components including water at surfaces and in bulk aqueous solutions using state-of-the-art non-linear scattering techniques.* **P.I.: Sylvie Roke**
Laboratory for fundamental BioPhotonics (LBP), Institute of Bioengineering (IBI), École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland.
- 09.2014 - 04.2015 **Post-doctoral Researcher**, *Elucidating the molecular mechanisms of ion – biomacromolecule interactions and the complex phase behavior of monoclonal antibodies.* **P.I.: Paul S. Cremer**
Cremer Research Group, Department of Chemistry, Pennsylvania State University, University Park, PA, USA.
- 08.2009 - 08.2014 **Doctor of Philosophy**, (Chemistry, GPA: 4.00/4.00)
Thesis title: *Hofmeister Chemistry: weak cation binding to protein backbones & biomolecular size influence on specific ion effects.* **Advisor: Paul S. Cremer**
Cremer Research Group, Department of Chemistry, Pennsylvania State University, University Park, PA, USA.
- 05.2007 - 07.2009 **Master of Science**, (Chemistry, High-Honor degree)
Thesis Title: *The Phase Behavior and Synthesis of Mesostructured Coupled Semiconductor Thin Films: Meso-CdS-TiO₂.* **Advisor: Omer Dag**
Dag Research Group, Chemistry Department, Bilkent University, Ankara, Turkey
- 09.2002 - 05.2007 **Bachelor of Science**, (Chemistry, Honor degree)
Bilkent University, Ankara, Turkey

Honors & Awards

- 2017 Best Poster Presentation Award, Swiss Chemical Society Fall Meeting.
- 2013 – 2014 Apple Fellowship, Penn State University.
- 2007 – 2009 Graduate Fellowship, TUBITAK (Turkish Science Foundation).
- 2002 – 2007 Full Undergraduate Scholarship (including tuition waiver, accommodation, health insurance and full stipend), Bilkent University.

Publications

(Citations: 750, h-index: 14, Google Scholar as of 22.10.19), ORCID: 0000-0002-2492-1168

- **Peer-Reviewed Journal Articles:** (reverse - chronological order)
 - 1) Halil I. Okur, Orly Tarun, Sylvie Roke “*The Chemistry of Lipid Membranes - from Models to Living Systems: A Perspective of Hydration, Surface Potential, Curvature, Confinement and Heterogeneity*” **The Journal of American Chemical Society**, 2019, 141, 31, 12168-12181.
Research Highlight: Perspective Article
Featured on the journal cover.

- 2) Bradley A. Rogers, Kelvin B. Rembert, Matthew F. Poyton, Halil I. Okur, Amanda R. Kale, Tinglu Yang, Jifeng Zhang, Paul S. Cremer “*A Stepwise Mechanisms for Aqueous Two-phase System Formation in Concentrated Antibody Solutions*” **The Proceedings of National Academy of Sciences U.S.A.**, 2019, 116, (32), 15784-15791.
Research Highlight: Featured in 7 media covers.
- 3) Evangelia Zdrali, Halil I. Okur, Sylvie Roke “*Specific Ion Effects at the Interfaces of Nanometer-sized Droplets in Water: Structure and Stability*” **The Journal of Physical Chemistry C**, 2019, 123, 27, 16621-16630.
- 4) Evangelia Zdrali, Marcel D. Baer, Halil I. Okur, Christopher J. Mundy and Sylvie Roke “*The Diverse Nature of Ion Speciation at the Nanoscale Hydrophobic/Water Interface*” **The Journal of Physical Chemistry B**, 2019, 123, 10, 2414-2423.
- 5) Jan Dedic, Sandra Rocha, Halil I. Okur, Pernilla Wittung-Stafshede and Sylvie Roke “*Membrane – Protein – Hydration Interaction of α -Synuclein with Anionic Vesicles Probed via Angle-Resolved Second Harmonic Scattering.*” **The Journal of Physical Chemistry B**, 2019, 123, 5, 1044-1049.
- 6) Halil I. Okur, Chad I. Drexler, Eric Tyrode, Paul S. Cremer, Sylvie Roke “*The Jones-Ray effect is not caused by surface-active impurities.*” **The Journal of Physical Chemistry Letters**, 2018, 9, 6739-6743.
- 7) Filip Kovacik, Halil I. Okur, Nikolay Smolentsev, Rüdiger Scheu, Sylvie Roke “*Hydration mediated interfacial transitions on mixed hydrophobic/hydrophilic nanodroplet interfaces*” **Journal of Chemical Physics**, 2018, 149, 234704.
- 8) Yixing Chen, Halil I. Okur, Cornelis Luetgebaucks, Sylvie Roke “*Zwitterionic and charged lipids form remarkably different structures on nanoscale oil droplets in aqueous solution*” **Langmuir**, 2018, 34 (3), 1042-1050.
- 9) Yixing Chen, Halil I Okur, Nathan Dupertuis, Jan Dedic, David M Wilkins, Michelle Ceriotti, Sylvie Roke “*Comment on water-water correlations in electrolyte solutions probed by hyper-Rayleigh scattering*” **Journal of Chemical Physics**, 2018, 149, 167101.
- 10) Valerija Vežočník, Vesna Hodnik, Simona Sitar, Halil I. Okur, Magda Tušek Žnidarič, Cornelis Lütgebaucks, Kristina Sepčić, Ksenija Kogej, Sylvie Roke, Ema Žagar, and Peter Macek “*Kinetically stable triglyceride-based nanodroplets and their interactions with lipid-specific proteins*” **Langmuir**, 2018, 34, 30, 8983-8993.
- 11) Yixing Chen, Nathan Dupertuis, Halil I. Okur, Sylvie Roke “*Temperature dependence of molecular interactions in bulk water probed by femtosecond elastic second harmonic scattering*” **Journal of Chemical Physics**, 2018, 148, 222835.
- 12) Halil I. Okur, Jana Hladílková, Kevin B. Rembert, Younhee Cho, Jan Heyda, Joachim Dzubiella, Paul S. Cremer, Pavel Jungwirth “*Beyond the Hofmeister series: ion-specific effects on proteins and their biological functions*” **The Journal of Physical Chemistry B**, 2017, 121 (9), 1997-2014.
Research Highlight: Featured article
Featured on the journal cover.

- 13) Halil I. Okur, Yixing Chen, David M. Wilkins, Sylvie Roke “*The Jones-Ray effect reinterpreted: surface tension minima of low ionic strength electrolyte solutions are caused by electric field induced water-water correlations*” **Chemical Physics Letters**, 2017, 684, 433-442.
Research Highlight: Frontier article
Featured on the journal cover.
- 14) Jan Heyda[‡], Halil I. Okur[‡], Jana Hladílková, Kelvin B. Rembert, William Hunn, Tinglu Yang, Joachim Dzubiella, Pavel Jungwirth, Paul Cremer “*Guanidinium can both cause and prevent the hydrophobic collapse of biomacromolecules*” **Journal of the American Chemical Society**, 2017, 139 (2), 863-870.
([‡] equally contributed first authors)
- 15) Halil I. Okur, Yixing Chen, Nikolay Smolentsev, Evangelia Zdrali, Sylvie Roke “*Interfacial structure and hydration of 3D-lipid monolayers in aqueous solution*” **The Journal of Physical Chemistry B**, 2017, 121 (13), 2808-2813.
- 16) Carlos Macias-Romero, Igor Nahalka, Halil I. Okur, Sylvie Roke “*Optical imaging of surface chemistry and dynamics in confinement*”, **Science**, 2017, eaal4346.
Research Highlight: Featured in 7 media covers.
- 17) Evangelia Zdrali, Yixing Chen, Halil I. Okur, David M. Wilkins, Sylvie Roke “*The molecular mechanism of nanodroplet stability*” **ACS Nano**, 2017, 11 (12), 12111–12120.
- 18) Yixing Chen, Halil I. Okur, Chungwen Liang, Sylvie Roke “*Orientalional ordering of water in extended hydration shells of cations is ion-specific and correlates directly with viscosity and hydration free energy*” **Physical Chemistry Chemical Physics**, 2017, 19, 24678-24688.
- 19) Yixing Chen, Halil I. Okur, Nikolaos Gomopoulos, Carlos Macias-Romero, Paul S. Cremer, Poul B. Petersen, Gabriele Tocci, David M. Wilkins, Chungwen Liang, Michele Ceriotti, Sylvie Roke “*Electrolytes induce long-range orientational order and free energy changes in the H-bond network of bulk water*” **Science Advances**, 2016, 2, 4, e1501891.
Research Highlight: Featured in 10 media covers.
- 20) Nikolay Smolentsev, Cornelis Luetgebaucks, Halil I. Okur, Alex G. F. De Beer, Sylvie Roke “*Intermolecular Headgroup Interaction and Hydration as Driving Forces for Lipid Transmembrane Asymmetry*” **Journal of the American Chemical Society**, 2016, 138, 12, 4053-4060.
- 21) Yixing Chen, Kailash C. Jena, Cornelis Luetgebaucks, Halil I. Okur, Sylvie Roke “*Three Dimensional Nano ‘Langmuir Trough’ for Lipid Studies*” **Nano Letters**, 2015, 15 (8), 5558-5563.
- 22) Kelvin B. Rembert, Halil I. Okur, Christian Hilty, Paul S. Cremer “*An NH Moiety is not Required for Anion Binding to Amides in Aqueous Solution*” **Langmuir**, 2015, 31 (11), 3459-3464.
- 23) Halil I. Okur, Jaibir Kherb, Paul S. Cremer “*Cations bind only weakly to amides in aqueous solutions*” **Journal of the American Chemical Society**, 2013, 135 (13), 5062-5067.
- 24) Jana Hladílková, Jan Heyda, Kelvin B. Rembert, Halil I. Okur, Yadagiri Kurra, Wenshe R. Liu, Christian Hilty, Paul S. Cremer, Pavel Jungwirth “*Effect of end-group termination on salting-out constants for triglycine*” **The Journal of Physical Chemistry Letters**, 2013, 4 (23), 4069-4073.
- 25) Jana Paterova, Kelvin B. Rembert, Jan Heyda, Yadagiri Kurra, Halil I. Okur, Wenshe R. Liu, Christian Hilty, Paul S. Cremer, Pavel Jungwirth “*Reversal of the Hofmeister series: Specific Ion Effects on Peptides*” **The Journal of Physical Chemistry B**, 2013, 117 (27), 8150-8158.

26) Halil I. Okur, Yurdanur Turker, Omer Dag “*Synthesis of Stable Mesostructured Coupled Semiconductor Thin Films: meso-CdS-TiO₂ and meso-CdSe-TiO₂*” **Langmuir**, 2010, 26 (1), 538-544.

- **Articles Under Review:**

27) Jan Dedic, Halil I. Okur, Sylvie Roke “Polyelectrolytes induce water-water correlations that result in dramatic viscosity changes and nuclear quantum effects” **Science Advances**, in the 2nd round of revision.

- **Conference Papers:**

- 1) Halil Okur, Yixing Chen, David Wilkins, Sylvie Roke, “*The Jones-Ray Effect Reinterpreted: Surface Tension Minima of Low Ionic Strength Electrolyte Solutions are caused by Electric Field Induced Water-Water Correlations*” Abstract of papers of the American Chemical Society, 2018, 255.
- 2) Yixing Chen, Halil Okur, Cornelis Luetgebaucks, Sylvie Roke “*Zwitterionic and charged lipids form remarkably different structures on nanoscale oil droplets in aqueous solution*” Abstract of papers of the American Chemical Society, 2018, 255.
- 3) Nikolay Smolentsev, Cornelis Luetgebaucks, Halil Okur, Sylvie Roke “*Intermolecular Headgroup Interaction and Hydration as Driving Forces for Lipid Transmembrane Asymmetry*” Abstract of papers of the American Chemical Society, 2018, 255.
- 4) Brad Rogers, Kelvin Rembert, Matt Poyton, Halil Okur, Tinglu Yang, Jifeng Zhang, Paul S. Cremer “*Exploring the mechanisms of liquid-liquid phase separation in concentrated protein solutions*” Abstract of papers of the American Chemical Society, 2017, 254.
- 5) Paul Cremer, Halil Okur, Kelvin Rembert “*Charging of organic interfaces with ions from aqueous solutions*” Abstract of papers of the American Chemical Society, 2012, 244.
- 6) Yurdanur Turker, Halil I. Okur, Omer Dag “*INOR 142 – Transition metal salt: Pluronic lyotropic liquid crystalline systems for nanostructured and mesostructured materials*” Abstract of papers of the American Chemical Society, 2007, 234.

Invited Talks & Poster Presentations

- **Invited talks:**

- “*The Lipid Membrane Chemistry: A hydration and surface potential perspective*” Solvate, February **2019**, Lyon, France.
- “*Interfacial Structure and Hydration of Model Membranes Elucidated with Non-Linear Scattering Techniques*” ITCP, May **2018**, Trieste, Italy.
- “*Elucidation of Physiological Surface Chemical Processes with Molecular Level Details*” Max-Planck Colloquium, January **2018**, Berlin, Germany.
- “*Exploring Biointerfaces at the molecular level*” KAUST, November **2017**, Thuwal, Saudi Arabia.
- “*Probing the 3D Lipid Monolayers at the Surface of Adiposome Organelle Models*”, Swiss Chemical Society, Fall Meeting, August **2017**, Bern, Switzerland.
- “*3-D Lipid Membranes*” Telluride Workshop, Complexity in the Chemistry and Physics of Lipid Membranes, July **2016**, Telluride, CO, USA.
- “*Molecular Basis of Oil-droplet Stability in Aqueous Solutions*” KAUST International Conference on Physics & Chemistries at Hydrophobic Interfaces. KAUST, February **2016**, Thuwal, Saudi Arabia.
- “*Hofmeister Chemistry: Cations only Bind Weakly to Protein Backbones & the Influence of Polymer Size on Specific Ion Effects*” École Polytechnique Fédérale de Lausanne (EPFL), November **2014**, Lausanne, Switzerland.

- **Selected oral / poster presentations**

- “*The Jones-Ray Surface Tension Minimum Reinterpreted*”, Water and Aqueous Solution Gordon Conference, August, 2018, Holderness, NH, USA.
- “*Molecular Insights on the 3D Lipid Monolayers of Lipid Droplet Organelle*” Swiss Chemical Society,

- Fall Meeting, August 2017, Bern, Switzerland
- “Three Dimensional Nano “Langmuir Trough” for Lipid Studies” CECAM, Liquid/Solid Interfaces 3rd edition, January 2016, Lausanne, Switzerland
 - “Intermolecular Headgroup Interaction and Hydration as Driving Forces for Lipid Transmembrane Asymmetry” CECAM, Liquid/Solid Interfaces 3rd edition, January 2016, Lausanne, Switzerland.
 - “The Interactions of Hofmeister Cations with Peptides” Gordon Research Conferences, Vibrational Spectroscopy, July 2014, Biddeford, ME, USA.
 - “The Interactions of Hofmeister Cations with Peptides” Gordon Research Conferences, Water & Aqueous Solution, August 2014, Holderness, NH, USA.
 - “Cations Bind only Weakly to Amides in Aqueous Solutions” Penn State Graduate Exhibition March 2014, University Park, PA, USA.
 - “The Interaction of Hofmeister Cations with Peptide” Biophysical Society Pennsylvania Networking Meeting, October 2013, University Park, PA, USA.
 - “Probing Cation – Protein Interactions with SFG and FT-IR Vibrational Spectroscopy” Gordon Research Conferences, Vibrational Spectroscopy, July 2012, Biddeford, ME, USA.
 - “Specific Cation-Amide Association in Aqueous Solutions” Graduate Research Week, 2012, Texas A&M University.
 - “The Effect of Various Transition Metal Salts to the Synthesis of Mesostructured Titania” Symposium on Surface Science, 2008, Ankara, Turkey.
 - “The Effect of Various Transition Metal Salts to the Synthesis of Mesostructured Titania” NanoTR4, 2007, Istanbul, Turkey.

Professional Activities

- **Journal Referee Services (30+ manuscript revisions)**

Serves as a reviewer for peer-reviewed journals, including *J. Am. Chem. Soc.*, *Angew. Chem. Int. Ed.*, *Nano Letters*, *J. Phys. Chem. B*, *C*, and *Letters*, *Langmuir*, *Chemical Science* and *Journal of Food Science*.