

Himanshu Khandelia

MEMPHYS, Center for Biomembrane Physics
University of Southern Denmark (SDU)
Campusvej 55, 5230 Odense M, Denmark

email: hkhandelia@gmail.com
Phone: +45 6550 3510 (o)
+45 2912 5467 (m)

DATE OF BIRTH 28-12-1977

CURRENT POSITION Associate Professor, University of Southern Denmark

EDUCATION

Ph.D., Chemical Engineering, 2001-2006 (GPA: 3.77/4.0) University of Minnesota, Minneapolis.

Advisor: Dr. Yiannis N. Kaznessis **Thesis:** Computer Simulations of Antimicrobial Peptides

5-year Integrated M. Tech., Biochemical Engineering and Biotechnology 1996-2001 (GPA: 8.94/10.0),
Indian Institute of Technology (IIT), New Delhi (Class Rank: 1)

SCIENTIFIC CAREER AND POSITIONS

2006-2009: Postdoc, MEMPHYS, Center for Biomembrane Physics, University of Southern Denmark (SDU) w. Ole G Mouritsen

2009-2010: Research Assistant Professor (SDU)

2010-2012: Assistant Professor (SDU)

2013-current: Associate Professor (SDU)

AWARDS AND EXTERNAL FUNDING

DENMARK:

2011 Lundbeckfonden Young Group Leader award for DKK 10 million (~ Euro 1.35 million)

2014 Novo Nordisk postdoctoral grant

2011-2016 Danish e-Infrastructure Cooperation (DeIC) computing grants.

2014-2015 International Network Programme (INP) grant with RIKEN, Japan

EUROPE (FP7):

PRACE Computing grant (2017): 18.0 million core hours from the PRACE 14th Project Access Call

Associated partner on the **FP7 EUROMEMBRANES** network: "OXPL" (2010-2012).

FP7 PRACE computing grants (2011) amounting to ~ 10 million core hours.

INTERNATIONAL:

2010: Samsung Korea awarded \$100,000 for work on Biomimetic Membranes in 2010.

Director's Doctoral Fellowship at the University of Minnesota in 2005, awarded to the top 5% PHD students.

SHORT RESUME OF SCIENTIFIC INTEREST

We employ and develop computational methods to investigate fundamental molecular scale biomolecular phenomena, with specific focus on simulations of membranes, and membrane-associated biological processes, including transport across membrane proteins and interaction of membranes with membrane-active molecules. Some key research areas are the mechanisms of ion selectivity in ion pumps, the biogenesis of lipid droplets, and

development of new methods to simulate proton transport in proteins. Much of my research is done in close collaboration with experimental groups.

PROJECT MANAGEMENT and MANAGERIAL EXPERIENCE

Besides smaller postdoctoral projects, I am currently managing one large DKK 10 million project. I have also managed the large FP7 PRACE grant with two international partners. I have completed a 2-day Project Management course at SDU, and plan to attend the advanced course next year.

SELECTED RESEARCH ACHIEVEMENTS

Method Development: We implemented algorithms that accelerate biomolecular simulations by a factor of two ([10.1021/ct500100f](https://doi.org/10.1021/ct500100f)). We developed accurate methods to calculate mechanical properties of lipid membranes ([10.1063/1.4826462](https://doi.org/10.1063/1.4826462)). We are currently working on methods to improve the stress and pressure calculations in simulations, and to simulate proton transport efficiently.

Ion Pumps: Our simulations combined with electrophysiology discovered a new ion pathway in the Na⁺ K⁺ ATPase, which has the potential to change textbook definitions on transport cycles ([10.1038/nature09309](https://doi.org/10.1038/nature09309)). We have made novel insights into the molecular mechanisms of diseases causing mutations in ([10.1021/bi401425g](https://doi.org/10.1021/bi401425g)) and regulation ([10.1074/jbc.M112.340406](https://doi.org/10.1074/jbc.M112.340406)) of ion pumps.

Lipid Droplets: Our large-scale simulations explained how a large amount of oil is accommodated in cancer cell membranes and for the first time, showed how lipid droplets can be formed in the Endoplasmic Reticulum membrane ([10.1371/journal.pone.0012811](https://doi.org/10.1371/journal.pone.0012811)).

Radioactive Soil Bioremediation: In collaboration with plant biologists in Japan, we have developed compounds that help remove radioactive Cesium from soil after the Fukushima disaster ([10.1038/srep08842](https://doi.org/10.1038/srep08842)).

Oxidized Phospholipids: We were the first to demonstrate the reorientation of lipid tails in oxidized lipids ([10.1016/j.bpj.2009.01.007](https://doi.org/10.1016/j.bpj.2009.01.007)) and the possibility of lipid oxidation driven phase separation in biomembranes, in collaboration with biophysicists in Prague ([10.1039/C3SM52310A](https://doi.org/10.1039/C3SM52310A)).

EDITORIAL CONTRIBUTIONS

Editor, Nature Scientific Reports. Referee for several journals for the Nature Group, ACS, RSC, EMBO and Elsevier Journals.

SUPERVISION and ACADEMIC TEACHING

One PhD and two Masters students have graduated under my supervision. I am currently supervising two other PhD students. I have supervised 4 postdocs, and am currently supervising 2 more.

I have **designed and developed a new Masters/PhD level course in Biomolecular Simulations (KE824)**. The course is aligned with SDU's policy of encouraging research in the computational sciences. The course has been offered three times and has received positive feedback. I have completed the "Pedagogicum" training on academic teaching. I also teach Physical Chemistry to second year Bachelor's students.

POSITIONS OF TRUST

Member, e-Science Board at SDU.

Referee for funding organizations in France, Netherlands, Poland, USA and PRACE. Referee for ESF scientific proposals.