Elif Karatay

Stanford University, Department of Mechanical Engineering, Building 500, Stanford, CA 94305, USA

EDUCATION

Ph.D. — **University of Twente, Netherlands**
Sept. 2009 - Sept. 2013
Faculty of Science and Technology
Thesis Title: Microfluidic Studies of Interfacial Transport
Advisors: Prof. Rob Lammertink and Prof. Peichun Amy Tsai
Defense Committee: Prof. Detlef Lohse, Prof. Matthias Wessling
Prof. Jens Harting, Prof. Han Gardeniers, Prof. Ali Mani

M.Sc. — **Middle East Technical University, Turkey**
Sept. 2007 - Aug. 2009
Department of Chemical Engineering
Graduated *Cum Laude*, 3.93 / 4.00 (Rank 3 over 56)
Thesis Title: Effect of Preparation and Operation Parameters on Performance of Polyethersulfone Based Mixed Matrix Gas Separation Membranes
Advisors: Prof. Levent Yılmaz and Prof. Halil Kalıpçılar

B.Sc. — **Middle East Technical University, Turkey**
Sept. 2002 - Jun. 2007
Department of Chemical Engineering
Graduated *Cum Laude*, 3.54 / 4.00 (Rank 8 over 124)

RESEARCH EXPERIENCE

Postdoctoral researcher: **Center for Turbulence Research**
Nov. 2013 - present **Department of Mechanical Engineering**
Stanford University, USA
Computational and experimental research on chaotic electrokinetic phenomena, particularly focussing on instabilities stemming from coupling of hydrodynamics with ion transport and electrostatic forces.

Graduate researcher: **Group of Soft Matter, Fluidics and Interfaces at Mesa+ Institute for Nanotechnology, University of Twente, Netherlands**
Sept. 2009 - Sept. 2013 Experimental and numerical research on microfluidics, particularly focussing on mass and momentum transport near interfaces from bubble surfaces to charged materials.

Sept. 2007 - Aug. 2009: **Department of Chemical Engineering,**
Middle East Technical University, Turkey
Experimental research on development of zeolite filled polymer composite membranes for natural gas purification.

AWARDED GRANTS

Nov. 2013 - Nov. 2015: Individual Rubicon Grant from the Netherlands Organization for Scientific Research (NWO) for two years of research in Stanford University. Total sum of the grant is €127,690.-

PEER-REVIEWED PUBLICATIONS

1. **Karatay, E.**, Druzgalski, C. L., & Mani, A., 2015 Simulation of chaotic electrokinetic transport: Performance of commercial software versus custom-built direct numerical simulation codes. *Journal of Colloid and Interface Science*, 446, pp. 67-76.

2. **Karatay, E.**, Tsai, P. A., & Lammertink, R. G. H., 2013 Rate of gas absorption on a slippery bubble mattress. *Soft Matter*, 9, pp. 11098.

3. Haase, A. S., **Karatay, E.**, Tsai, P. A., & Lammertink, R. G. H., 2013 Transport over a bubble mattress: the influence of interface geometry on effective slip and mass transfer. *Soft Matter*, 9, pp. 8949.

4. **Karatay, E.**, Haase, A. S., Visser, C. W., Sun, C., Lohse, D., Tsai, P. A., & Lammertink, R. G. H., 2013 Control of slippage with tunable bubble mattresses. *Proceedings of the National Academy of Sciences of the USA*, 110 (21), pp. 8422-8426.

5. **Karatay, E.**, & Lammertink, R. G. H., 2012 Oxygenation by a superhydrophobic slip G/L contactor. *Lab on a chip*, 12, pp. 2922-2929.

6. Jagdheesh, R., Pathiraj, B., **Karatay, E.**, Römer, G. R. B. E., & Huis in't Veld, A. J., 2011 Laser-Induced Nanoscale Superhydrophobic Structures on Metal Surfaces. *Langmuir*, 27 (13), pp. 8464-8469.

7. **Karatay, E.**, Kalıpçılar, H., & Yılmaz, L., 2010 Preparation and performance assessment of binary and ternary PES-SAPO 34-HMA based gas separation membranes. *Journal of Membrane Science*, 364, pp. 7581.

In Preparation

1. **Karatay, E.**, Wessling, M., & Mani, A., 2015 Effects of buoyant forces on chaotic electroconvection.

Submitted

1. **Karatay, E.**, Yılmaz, L., & Kalıpçılar, H., 2015 Screening of Low Molecular Weight Additives for PES Based Ternary Mixed Matrix Gas Separation Membranes. *Submitted to Journal of Membrane Science*.

SELECTED CONFERENCE ABSTRACTS AND ANNUAL RESEARCH BRIEFS

1. **Karatay, E.**, Druzgalski, C. L., & Mani, A., Asesment of commercial software for simulation of chaotic electrokinetic phenomena. *Annual Research Briefs*, Center for Turbulence Research, Stanford University.

2. **Karatay, E.**, & Mani, A., Suitability of commercial software for direct numerical simulations of chaotic electrokinetic transport. *Division of Fluid Dynamics of the* 67^{th} *Annual Meeting of American Physical Society*, San-Francisco, USA, 23-25 November 2014.

3. **Karatay, E.**, Tsai, P. A., & Lammertink, R. G. H., Mass Transfer of Gas on Slippery Superhydrophobic Surface. *Division of Fluid Dynamics of the* 66^{th} *Annual Meeting of American Physical Society*, Pittsburgh, USA, 24-26 November 2013.

4. **Karatay, E.**, Haase, S., Visser, C.W., Sun, C., Lohse, D., Tsai, P.A., & Lammertink, R.G.H., Geometry-Influenced Slippage on a Bubble Mattress in Microfluidics. *Division of Fluid Dynamics of the* 65^{th} *Annual Meeting of American Physical Society*, Pittsburgh, USA, 18-20 November 2012.

5. **Karatay, E.**, & Lammertink, R.G.H., Oxygenation of Meandering Microchannels in a Microporous PVDF assisted micro G/L contactor. *The International Conferences on Microreaction Technology*, Lyon, France, 20-22 February 2012.

6. **Karatay, E.**, & Lammertink, R.G.H., Meander Reactor with G/L Contacting and Electrokinetic Separation Functionalities. *The Netherlands MicroNanoConference*, Ede, Netherlands, 15-16 November 2011.

7. **Karatay, E.**, & Lammertink, R.G.H., A multiplexed Micro-Reactor: Meander Reactor. *Microfluidics, Physics & Chemistry of Gordon Research Conference*, Waterville Valley, NH, USA, 26 June-1 July 2011. (Poster Presentation)

8. **Karatay, E.**, Lammertink, R.G.H., & Biesheuvel, P. M., Selective Removal of Hydroxylamine using Membrane Microchannels. *International Congress on Membranes and Membrane Processes, ICOM*, Amsterdam, Netherlands, 23-29 July 2011.

9. **Karatay, E.**, & Lammertink, R.G.H., Meander Reactor. *Netherlands Process Technology Symposium, NPS*, Veldhoven, Netherlands, 25-27 October 2010.

10. **Karatay, E.**, Kalıpçılar, H., & Yılmaz, L., Effect of preparation parameters on performance of polyethersulfone based mixed matrix gas separation membranes. *Euromembrane*, Montpellier, France, 6-10 September 2009.

TEACHING EXPERIENCE

Sept. 2009 - Sept. 2013 Department of Chemical Engineering, University of Twente, Netherlands
- Teaching Assistant
  - Membrane Practicum (Graduate Level)
  - Introduction to Computational Fluid Dynamics (Graduate Level)
- Supervision of 4 M.Sc. projects and 1 bachelor project.

Sept. 2007 - Jun. 2009 Department of Chemical Engineering, Middle East Technical University, Turkey
- Teaching Assistant:
  - Heat and Mass Transfer Operations (Undergraduate Level)
  - Mathematical Modeling in Chemical Engineering (Undergraduate Level)
  - Chemical Engineering Laboratory I and II (Undergraduate Level)
  - Advanced Transport Phenomena (Graduate Level)

FELLOWSHIPS, HONOURS AND AWARDS

- Individual Rubicon Grant from the Netherlands Organization for Scientific Research (NWO), 2013-2015
- Best Performance Graduate Student Award by Graduate School of Natural and Applied Sciences of Middle East Technical University, Turkey, 2009
- Dean's High Honor List for all academic semesters, Middle East Technical University, Turkey, 2003-2007
- Scholarship for Graduate Research from the Scientific and Technological Research Council of Turkey (TÜBİTAK), 2007-2009
- Scholarship for Undergraduate Education from MNG Company, 2005-2007
- Scholarship for Undergraduate Education from Turkish Government, 2002-2007

PROFESSIONAL ACTIVITIES

- Referee for Journals; Physics of Fluids, Nanoscale, Journal of Fluid Mechanics, European Journal of Mechanics - B/Fluids.

SKILLS

Softwares:	Comsol, Matlab, Mathematica, Image J, LIFA-X, GIMP, KeyCreator
Office:	LaTeX, MS Office
Operating Systems:	Windows, Linux, IOS
Languages:	Turkish (Native), English (Fluent), Dutch (Beginner), German (Beginner)

RESEARCH INTERESTS

- Electrokinetic phenomena near charge selective interfaces
- Applications of superhydrophobic surfaces for drag reduction
- Microfluidics
- Transport phenomena
- Separation technology

REFERENCES

Available upon request.