

VERA MIKYOUNG HUR

EDUCATION

Brown University; PhD, Mathematics; 2006.

KAIST, Korea; BSc, Mathematics; 2000.

POSITIONS

University of Illinois at Urbana-Champaign; Associate Professor, Mathematics; 2015-present.

Brad and Karen Smith Professorial Scholar, College of Liberal Arts and Sciences; 2018-present.

Philippe Tondeur Scholar, Department of Mathematics; 2016-present.

Faculty Affiliate, Computational Science and Engineering; 2010-present.

Administrative

Associate Chair for Faculty, Department of Mathematics; 2017–present. Duties include:

- Overseeing mentoring of junior and postdoctoral faculty;
- Enhancing opportunities for faculty research and recognition;
- Advancing careers of faculty.

Previous

University of Illinois at Urbana-Champaign; Assistant Professor, Mathematics; 2009-2015.

Massachusetts Institute of Technology; CLE Moore Instructor, Mathematics; 2006-2009.

Longterm Visiting

Institute for Computational and Experimental Research in Mathematics; Spring 2017.

Brown University, Department of Mathematics; 2016-2017.

Mathematical Sciences Research Institute; Fall 2015.

California Institute of Technology, Department of Computing and Mathematical Sciences; Fall 2012.

California Institute of Technology, Department of Mathematics; Spring 2011.

Institute for Mathematics and its Applications; 2009-2010.

Institut Mittag-Leffler, Sweden; Fall 2005.

HONORS AND RECOGNITIONS

Brad and Karen Smith Professorial Scholar; University of Illinois at Urbana-Champaign, College of Liberal Arts and Sciences; 2018.

Philippe Tondeur Scholar; University of Illinois at Urbana-Champaign, Department of Mathematics; 2016.

Simons Fellow in Mathematics; Simons Foundation; 2016.

Invited Plenary Hour Address; AMS Sectional Meeting; 2015.

Faculty Early Career Development (CAREER) Award; National Science Foundation; 2014.

Beckman Fellow; University of Illinois at Urbana-Champaign, Center for Advanced Study; 2014.
 (Awarded one semester of release time, with additional recognition for outstanding younger fellows who have already made distinctive scholarly contributions.)
 Arnold O. Beckman Award; University of Illinois at Urbana-Champaign, Campus Research Board; 2014, 2016. (Selected as projects of special distinction or promise.)
 Selection for *Nonlinearity* Highly Downloaded Collection, 2012.
 Alfred P. Sloan Research Fellowship; 2012.
 List of Teachers Ranked as Excellent; University of Illinois at Urbana-Champaign; 2011, 2013, 2014.
 (6 courses out of 12)
 Dissertation Fellowship; Brown University, Department of Mathematics; 2005.

FUNDING

Grants

National Science Foundation, CAREER and Applied Mathematics; DMS-1352597; \$419,777; 2014-present.
 University of Illinois at Urbana-Champaign, Campus Research Board and Beckman Research Endowment; RB16227; \$9,654; 2016-2017.
 Institute for Mathematics and its Applications; Participating Institution Conference Award; \$4,000; 2016-2017.
 National Science Foundation, Infrastructure; DMS-1565670; \$29,270; 2016-2017.
 University of Illinois at Urbana-Champaign, Campus Research Board and Beckman Research Endowment; RB14100; \$18,632; 2014-2016.
 National Science Foundation, Applied Mathematics; DMS-1008885; \$143,231; 2010-2014.
 University of Illinois at Urbana-Champaign, Campus Research Board; RB11162; \$20,000; 2011-2012.
 National Science Foundation, Applied Mathematics; DMS-0707647, 1002854; \$121,867; 2007-2011.

Scholarships

University of Illinois at Urbana-Champaign, College of Liberal Arts and Sciences; Brad and Karen Smith Professorial Scholar; 2018-present.
 University of Illinois at Urbana-Champaign, Department of Mathematics; Philippe Tondeur Scholar; 2016-present.
 Simons Fellow in Mathematics; 2016-2017.
 Institute for Computational and Experimental Research in Mathematics; Research Fellowship; 2017.
 Mathematical Sciences Research Institute; General Membership; 2015.
 University of Illinois at Urbana-Champaign, Center for Advanced Study; Beckman Fellowship; 2014-2015.
 Alfred P. Sloan Research Fellowship; 2012-2016.
 Institute for Mathematics and its Applications; General Membership; 2009-2010.
 Association for Women in Mathematics; Travel Grant; 2006.
 Institut Mittag-Leffler, Sweden; Postdoctoral Fellowship; 2005.
 Brown University; Dissertation Fellowship; 2005-2006.

PUBLICATIONS

Articles in Journals

- [31] Stokes waves with constant vorticity: II. limiting waves.
in preparation (2018)
(with Sergey A. Dyachenko).
- [30] Stokes waves with constant vorticity: I. numerical computation.
preprint (2017) 35pp
(with Sergey A. Dyachenko).
- [29] Shallow water models with constant vorticity.
European Journal of Mechanics – B/Fluids, to appear, 21pp
(in Special Issue: Breaking Waves).
- [28] Modulational instability in the full-dispersion Camassa-Holm equation.
Proceedings of the Royal Society A: Mathematical, Physical & Engineering Sciences, 474 (2017) 20170153, 18pp
(with Ashish Kumar Pandey).
- [27] Transverse instabilities in equations of Kadomtsev-Petviashvili type.
preprint (2017) 22pp
(with Mathew A. Johnson and Ashish Kumar Pandey).
- [26] Norm inflation for equations of Korteweg-de Vries type with fractional dispersion.
Submitted (2017) 15pp.
- [25] Oscillation estimates of eigenfunctions via the combinatorics of noncrossing partitions.
Discrete Analysis 2017:13, 20pp, DOI:10.19086/da.2012
(with Mathew A. Johnson and Jeremy L. Martin).
- [24] Modulational instability in a full-dispersion shallow water model.
Submitted (2016) 56pp (with Ashish Kumar Pandey).
- [23] Modulational instability in nonlinear nonlocal equations of regularized long wave type.
Physica D: Nonlinear Phenomena, 325 (2016) 98-112
(with Ashish Kumar Pandey).
- [22] On the recovery of traveling water waves with vorticity from the pressure at the bed.
European Journal of Mechanics – B/Fluids, 60 (2016) 99-109
(with Michael R. Livesay).
- [21] Pressure transfer functions for interfacial fluids problems.
Journal of Mathematical Fluid Mechanics, 19 (2017) 59-76
(with Robin Ming Chen and Samuel Walsh).
- [20] Modulational instability in the Whitham equation with surface tension and vorticity.
Nonlinear Analysis: Theory, Methods & Applications, 129 (2015) 104-118
(with Mathew A. Johnson).

- [19] Kinetic, potential and surface tension energies of solitary waves in deep water.
Journal of Physics A: Mathematical and Theoretical, 48 (2015) 42FT01, 8pp
(in Fast Track Communications Section).
- [18] Wave breaking in the Whitham equation.
Advances in Mathematics 317 (2017) 410-437.
- [17] Wave breaking in a shallow water model.
SIAM Journal on Mathematical Analysis, to appear, 28pp
(with Lizheng Tao).
- [16] Wave breaking for Whitham equations with fractional dispersion.
Nonlinearity, 27 (2014) 2937-2949
(with Lizheng Tao).
- [15] Modulational instability in the Whitham equation for water waves.
Studies in Applied Mathematics, 134 (2015) 120-143
(with Mathew A. Johnson).
- [14] Stability of periodic traveling waves for nonlinear dispersive equations.
SIAM Journal on Mathematical Analysis, 47 (2015) 3528-3554
(with Mathew A. Johnson).
- [13] Modulational instability and variational structure.
Studies in Applied Mathematics, 132 (2014) 285-331
(with Jared C. Bronski).
- [12] On the formation of singularities for surface water waves.
Communications in Pure and Applied Analysis, 11 (2012) 1465-1474.
(in Special Issue: Hydrodynamic Model Equations)
- [11] No solitary waves exist on 2D deep water.
Nonlinearity, 25 (2012) 3301-3312.
(in the *Nonlinearity* 2012 Highly Downloaded Collection)
- [10] Analyticity of rotational flows beneath solitary water waves.
International Research Mathematics Notices, 2012 (2012) 2550-2570.
- [9] Stokes waves with vorticity.
Journal d'Analyse Mathématique, 113 (2011) 331-386.
- [8] Strichartz estimates for the water-wave problem with surface tension.
Communications in Partial Differential Equations, 35 (2010) 2195-2252
(with Hans Christianson and Gigliola Staffilani).
- [7] Local smoothing effects for the water-wave problem with surface tension.
Comptes Rendus Mathématique. Académie des Sciences. Paris, 347 (2009) 159-162
(with Hans Christianson and Gigliola Staffilani).
- [6] Solitary waves of the rotation-modified Kadomtsev-Petviashvili equation.
Nonlinearity, 21 (2008) 2949-2979
(with Robin Ming Chen and Yue Liu).

- [5] Unstable surface waves in running water.
Communications in Mathematical Physics, 282 (2008) 733-796
(with Zhiwu Lin).
Erratum: 318 (2013) 857-861.
- [4] Symmetry of solitary water-waves with vorticity.
Mathematical Research Letters, 15 (2008) 491-510.
- [3] Symmetry of steady periodic water waves with vorticity.
Philosophical Transactions of the Royal Society A: Mathematical, Physical & Engineering Sciences, 365 (2007) 2203-2214.
(in Theme Issue: Water Waves)
- [2] Exact solitary water waves with vorticity.
Archive for Rational Mechanics and Analysis, 188 (2008) 213-244.
- [1] Global bifurcation of deep-water waves with vorticity.
SIAM Journal on Mathematical Analysis, 37 (2006) 1482-1521.

Chapters in Books

- [2] Stokes waves over a constant vorticity flow.
Tutorials, Schools, and Workshops in the Mathematical Sciences, Springer, to appear.
- [1] Modulational instability in equations of KdV type.
New Approaches to Nonlinear Waves (edited by Elena Tobisch) 83-133
Lecture Notes in Physics, 908, Springer, 2016
(with Jared C. Bronski and Mathew A. Johnson).

Bulletins, Reports, or Conference Proceedings

- [3] Toward the Benjamin-Feir instability.
Fields Institute Communications, to appear.
- [2] Instabilities in the Whitham equation for water waves.
Oberwolfach Reports, 12 (2015) 1052-1054.
- [1] Dispersive properties of surface water waves.
Oberwolfach Reports, 6 (2009) 434-436.

Doctoral Thesis Title

- [1] Steady Water Waves with Vorticity.
Brown University, 2006. vi+129 pages; 28 cm.

Online Courses

- [1] 18.034 Honors Differential Equations, Spring 2009.

MIT OpenCourseWare: Massachusetts Institute of Technology, License: Creative Commons BY-NC-SA.

<http://ocw.mit.edu/courses/mathematics/18-034-honors-differential-equations-spring-2009>.

Other Writing

- [2] WIM symposium highlights cutting edge research in mathematics.

Math Times, University of Illinois at Urbana-Champaign, Spring/Summer 2016.

- [1] Waves in water, from ripples to tsunamis and to rogue waves.

Math Times, University of Illinois at Urbana-Champaign, Spring/Summer 2013.

INVITED ADDRESSES

Seminars and Colloquia since 2013

(Information about 35 previous presentations will be provided upon request.)

Ohio State University; 2018.

Columbia University; 2018.

Pennsylvania State University; 2018.

Northeastern University; 2018.

Indiana University Bloomington; 2017.

University of California - San Diego; 2017.

University of California - Irvine; 2017. ($\times 2$)

Institute for Computational and Experimental Research in Mathematics; 2017.

University of Massachusetts - Dartmouth; 2017.

Massachusetts Institute of Technology; 2016.

Brown University; 2016.

Boston University; 2016.

Brandeis-Harvard-MIT-Northeastern Joint Mathematics Colloquium; 2016.

University of Wisconsin - Madison; 2015.

University of Missouri; 2015.

University of Michigan - Ann Arbor; 2014.

Issac Newton Institute for Mathematical Sciences, United Kingdom; 2014.

University of Washington - St. Louis; 2014.

University of Illinois - Chicago; 2013.

Conferences and Workshops since 2013

(Information about 22 previous presentations will be provided upon request.)

12th AIMS Conference on Dynamical Systems, Differential Equations and Application; Taipei, Taiwan; 2018. ($\times 3$)

SIAM Conference on Nonlinear Waves and Coherent Structures; Orange, California; 2018.

AMS Sectional Meeting; Columbus, Ohio; 2018.

Joint Mathematics Meetings; San Diego, California; 2018.

ESI Workshop; Vienna, Austria; 2017.

Fields Institute Workshop; Toronto, Canada; 2017.

CMO-BIRS Workshop; Oaxaca, Mexico; 2017.

ICERM Workshop; Providence, Rhode Island; 2017.

BIRS Workshop; Banff, Canada; 2016.

SIAM Conference on Nonlinear Waves and Coherent Structures; Philadelphia, Pennsylvania; 2016.

B'Wave 2016; Bergen, Norway; 2016.

2nd KUMU Conference on PDE, Dynamical Systems and Applications; Columbia, Missouri; 2016.

Joint Mathematics Meetings; Seattle, Washington; 2016.

SIAM Conference on Analysis of Partial Differential Equations; Scottsdale, Arizona; 2015.

Workshop on Non-local Dispersive Equations; Trondheim, Norway; 2015.

MSRI Workshop, Connections for Women; Berkeley, California; 2015.

NIMS Workshop on Nonlinear Waves and Fluid Mechanics; Daejeon, Korea; 2015.

Oberwolfach Workshop; Oberwolfach, Germany; 2015.

AMS Sectional Meeting; East Lansing, Michigan; 2015.

3rd Midwest Women in Mathematics Symposium; Chicago, Illinois; 2015.

SIAM Conference on Dynamical Systems; Snowbird, Utah; 2013.

71st Midwest PDE Seminar; Ann Arbor, Michigan; 2013.

Special Presentations

Horizons Seminar; Brown University, Department of Mathematics; 2017.

(Promoting research and work of traditionally under-represented mathematicians.)

Lunch Seminar for Women; Massachusetts Institute of Technology, Department of Mathematics; 2016.

(On research and career path, intended for women mathematics students.)

Spring Symposium; University of Illinois at Urbana-Champaign, Center for Advanced Study; 2016.

(Interdisciplinary symposium highlighting works of Center's associates and fellows.)

Introduction to Graduate Mathematics; University of Illinois at Urbana-Champaign, Department of Mathematics; 2013, 2017.

(For first-year mathematics graduate students.)

D.W.Weeks Lecture; Massachusetts Institute of Technology, Department of Mathematics; 2010.

(In honor of the first woman awarded Ph.D. in Mathematics at MIT in 1930, intended for general audience.)

TEACHING EXPERIENCE

Courses Taught at University of Illinois at Urbana-Champaign

*Graduate Topics Course on Water Waves; 2013, 2018.

Graduate Partial Differential Equations; 2011, 2014, 2017.

Undergraduate Partial Differential Equations; 2010, 2013.

Undergraduate Ordinary Differential Equations; 2009, 2010, 2012, 2013, 2014, 2016.

Courses Taught at Massachusetts Institute of Technology

*Undergraduate Topics Course: Hamiltonian Mechanics; 2008.

*Honors Differential Equations; 2007, 2009.

Calculus with Theory; 2007-2008.

Courses Taught at Brown University

Calculus I, II; 2003, 2004, 2006.

* denotes a newly developed course.

Teaching Recognitions

List of Teachers Ranked as Excellent; University of Illinois at Urbana-Champaign; 2011, 2013, 2014.
(6 courses out of 12)

Teaching Resource Developing

Course Steward; Undergraduate Ordinary Differential Equations; University of Illinois at Urbana-Champaign, Department of Mathematics; 2013-2014. Duties include:

- Preparing course package for instructors;
- Identifying issues with course design.

I-STEM Affiliate; University of Illinois at Urbana-Champaign; 2010-present.

Course Developer and Instructor; Honors Differential Equations; Massachusetts Institute of Technology, Department of Mathematics and OpenCourseWare; 2007-2009.

MENTORING EXPERIENCE

PhD Students

Ashish Kumar Pandey, current.

Postdoctoral Scholars Mentoring (Placement)

Sergey Dyachenko; 2015-present.

Lizheng Tao; 2013-2015. (Visiting Assistant Professor; University of California at Riverside)

Postdoctoral Scholars Mentoring at Institute for Computational and Experimental Research in Mathematics.

Seok Hyun Hong; Spring 2017.

Sergey Dyachenko; 2016-2017.

Visiting Scholars Sponsoring

Xiaoli Bian; Tianjin University of Education and Technology, China; 2016-2017.

Vanessa Barros de Oliveira; Universidade Federal de Bahia, Brazil; 2014-2015.

Graduate Student Research Supervising (Placement)

Michael R. Livesay; 2015-2016. (PhD Student, Mathematics; University of Illinois at Urbana-Champaign)

Seokjong Ryu; 2012–2013. (Assistant Professor, Economics; Shanghai University of Finance and Economics, China)

Nanjundamurthy Venkatasubbu; 2010–2012. (Weld Distortion Analyst; Caterpillar Inc)

Undergraduate Student Research Supervising

5 Honors Projects; University of Illinois at Urbana-Champaign, College of Engineering; 2012–present.

2 Undergraduate Research Opportunities Program projects; Massachusetts Institute of Technology; 2009.

Selected Panel Appearing

Professional Development Round-table Discussions for Graduate Students and Postdoctoral Fellows; Institute for Computational and Experimental Research in Mathematics; 2017.

AWM Graduate Student Poster Session; Joint Mathematics Meetings; 2016.

Work-Life Balance: Family, Two-Body Issue/Partner Expectations; MSRI Connection for Women Workshop and 3rd Midwest Women in Mathematics Symposium; 2015.

SERVICE

Conference and Session Organizing

Principal Organizer; 4th Midwest Women in Mathematics Symposium; Urbana, Illinois; 2016.

(One-day workshop, two one-hour presentations and eight short ones by early career researchers.)

(Supported by National Science Foundation and Institute for Mathematics and Applications.)

Sessions Co-organizer; AMS Central Sectional Meeting; Chicago, Illinois; 2015.

(18 short presentations; co-organized with two early-career women researchers.)

Co-organizer; 74th Midwest PDE Conference; Urbana, Illinois; 2014.

(Two-day workshop; six one-hour and six short presentations; half of speakers women.)

Mini-symposia Co-organizer; SIAM Conference on Analysis of Partial Differential Equations; Lake Buena Vista, Florida; 2013. (8 presentations)

Session Co-organizer; Equadiff 2011; Loughborough, United Kingdom; 2011. (8 presentations)

Co-organizers; 67th Midwest PDE Conference; Urbana, Illinois, USA; 2011. (six one-hour and nine short presentations)

Mini-symposia Co-organizer; SIAM Conference on Analysis of Partial Differential Equations; Miami Florida; 2009. (8 presentations)

Reviewing

External Reviewer; University of Missouri Research Board; 2014.

Member, Habilitation Committee; University of Vienna, Austria; 2013.

Reviewer; Institute for Mathematics and its Applications, Participating Institute Conference Awards; 2012, 2013.

Reviewer; Illinois Campus Research Board; 2012–present.

Member; Selection Committee, AWM Anniversary Conference; 2011.

Panel; National Science Foundation; 2010, 2011, 2012, 2015, 2017, 2018.

Selected Activities of Diversity and Inclusion

Member; Senior Women Faculty Advisory Committee; University of Illinois at Urbana-Champaign, College of Liberal Arts and Sciences; 2017-present. Counseling on:

- How to better support women faculty in path to promotion to full professor;
- How to identify and support women faculty for leadership roles in college.

Speaker; Lunch Seminar for Women; Massachusetts Institute of Technology, Department of Mathematics; 2016. (On research and career path, intended for women mathematics students.)

Discussion Leader and Participant; Brown University, Women Educators Teaching in STEM; 2016. (Discussion group about teaching by, for, and as women in STEM fields.)

Principal Organizer; 4th Midwest Women in Mathematics Symposium; 2016.

Mentor; Joint Mathematics Meetings, AWM Graduate Student Poster Session; Seattle, Washington; 2016.

Speaker and Panelist; MSRI Workshop, Connection for Women; California; 2015.

Speaker and Panelist; 3rd Midwest Women in Mathematics Symposium; Illinois; 2015.

Speaker and Member of Selection Committee; AWM Anniversary Conference; 2011.

Campus and Departmental Service at University of Illinois at Urbana-Champaign (excluding committee assignments)

Member; Senior Women Faculty Advisory Committee, College of Liberal Arts and Sciences; 2017-present.

Member; Search Committee, Chair of the Department of Mathematics; 2017.

Associate Chair for Faculty; Department of Mathematics; 2017-present.

Member; Evaluation Committee, Chair of the Department of Mathematics; 2015-2016.

Member; Strategic Planning Committee, Office of Undergraduate Research; 2015.

Member; Advisory Board, Program for Interdisciplinary and Industrial Internships at Illinois; 2014-present. (Connecting mathematics graduate students with internships in industries and government and on-campus labs.)

Co-Organizer; Harmonic Analysis and Differential Equations Seminar; 2009-present.

Selected Committee Assignments at University of Illinois at Urbana-Champaign, Department of Mathematics

Member; Strategic Planning Committee; 2014-present.

Member, Graduate Application Screening Committee; 2013.

Chair; Mathematics in Science and Society Colloquium; 2012-2013.

(On topics in connection and interaction of mathematics with other scholarly disciplines and society.)

(Host of William Tabor, Jet Propulsion Laboratory; Robert Lang, Origami; Stephen Wolfram, Wolfram Research; Carl Wunsch, MIT and Harvard, Physical Oceanography)

Member; Postdoctoral Search Committee; 2009, 2013, 2017.

Journal Refereeing since 2013

(Information about 15 previous referring activities will be provided upon request.)

Annales de l'Institut Henri Poincaré (C) – Analyse non linéaire.

Applied Mathematics Letters.

Archive for Rational Mechanics and Analysis.

Bulletin of the London Mathematical Society.

Communications in Pure and Applied Analysis. (×2)

Communications in Partial Differential Equations.

Computational and Applied Mathematics.

Discrete and Continuous Dynamical Systems – Series A.

European Journal of Mechanics – B/Fluids. (×2)

International Mathematics Research Notices

Journal of Differential Equations.

Journal of Fluid Mechanics.

Journal of the London Mathematical Society. (×2)

Journal of Mathematical Fluid Mechanics. (×2)

Journal of Nonlinear Science.

Mathematische Nachrichten.

Nonlinearity.

Physica D: Nonlinear Phenomena. (×2)

Proceedings of the American Mathematical Society.

SIAM Journal on Mathematical Analysis.

Transactions of the American Mathematical Society. (×2)

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