

**CONTACT INFORMATION** 77 Massachusetts Avenue, 2-279 *phone:* 617.253.3214  
 Massachusetts Institute of Technology *fax:* 617.253.4381  
 Department of Mathematics *email:* verahur@math.mit.edu  
 Cambridge, MA 02139-4307 USA *web:* math.mit.edu/~verahur

**EMPLOYMENT** **Massachusetts Institute of Technology (MIT)**, Cambridge, Massachusetts, USA  
 C.L.E. Moore Instructor, July 2006–present.

**FUNDED RESEARCH** **NSF Grant** DMS-0707647, *Problems in the mathematical theory of water waves*, 2007 – 2010, \$121,867.00.

**EDUCATION** **Brown University**, Providence, Rhode Island, USA

Ph.D. in Mathematics, 2006  
 Thesis advisor: Walter Strauss.

**Seoul National University**, Seoul, South Korea

M.A. student in Mathematics, 2000 – 2001.

**Korea Advanced Institute of Science and Technology (KAIST)**, Daejeon, South Korea

B. Sc. in Mathematics, 2000.

**PUBLICATIONS** **Journal articles**

8. (with Hans Christianson and Gigliola Staffilani) *Local smoothing effects for the water-wave problem with surface tension*, 91 pages. Available at [arXiv:0809.4515](https://arxiv.org/abs/0809.4515).
7. (with Hans Christianson and Gigliola Staffilani) *Local smoothing effects for the water-wave problem with surface tension*, *Comptes Rendus Acad. Sci. Paris*, **347**, 159-162 (2009).
6. (with Robin Ming Chen and Yue Liu) *Solitary waves of rotation-modified Kadomtsev-Petviashvili equation*, *Nonlinearity*, **21**, 2949–2979 (2008).
5. (with Zhiwu Lin) *Unstable surface waves in running water*, *Comm. Math. Phys.*, **282**, 733-796 (2008).
4. *Symmetry of solitary water-waves with vorticity*, *Math. Res. Lett.*, **15**, 491–510 (2008).
3. *Symmetry of steady periodic water waves with vorticity*, *Philos. Trans. R. Soc. Lond. Ser. A*, **365**, 2203–2214 (2007).
2. *Exact solitary water waves with vorticity*, *Arch. Rational Mech. Anal.*, **188**, 213–244 (2008).
1. *Global bifurcation of deep-water waves with vorticity*, *SIAM J. Math. Anal.*, **37**, 1482–1521 (2006).

All manuscripts are available at <http://math.mit.edu/~verahur>.

## Conference Proceedings

1. *Dispersive properties of surface water waves*, Oberwolfach Report 2009.

## RESEARCH INTERESTS

**Analysis and Differential equations:** theories of surface water-waves, the Euler equations and the Navier-Stokes equations with free boundary, stability/instability in fluid mechanics and geophysics, weakly nonlinear dispersive models of the water-wave problem.

## TALKS

### Seminar lectures

*Minnesota* (04/2009), *Georgia Tech* (04/2009), *Stony Brook* (02/2009), *Texas A & M* (02/2009), *Ohio State* (02/2009), *UIUC* (01/2009), *Chicago* (01/2009), *McGill* (01/2009), *Vanderbilt* (01/2009), *Rochester* (01/2009), *UCSC* (01/2009), *UCLA* (01/2009), *UC Davis* (01/2009), *USC* (12/2008), *UCSD* (12/2008), *Bath* (UK, 08/2008), *KAIST* (South Korea, 06/2008), *Postech* (South Korea, 06/2008), *SNU* (South Korea, 05/2008, 06/2008), *MIT* (11/2006, 03/2009), *Harvard* (10/2006), *Missouri-Columbia* (10/2006), *Maryland, College Park* (04/2006), *Northwestern* (02/2006, 01/2009), *Mittag-Leffler* (Sweden, 10/2005, 11/2005), *Brown* (02/2005, 01/2006, 03/2006, 04/2009).

### Conference and workshop lectures

SIAM Annual Meeting, Denver, CO, 07/2009.

Oberwolfach Workshop on Wave Motion, Oberwolfach, Germany, 02/2009.

AIMS 7th International Conference on Dynamical Systems, Differential Equations and Applications, Arlington, TX, 05/2008.

SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, 12/2007.

BIRS Workshop, Recent Progress on Nonlinear Elliptic and Parabolic Problems and Related Abstract Methods, Banff, Canada, 10/2007.

AWM Workshop for Women Graduate Students and Recent PhDs, in conjunction with SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, 05/2007.

The 5th IMACS International Conference, on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, 02/2007.

Kyoto Conference on Navier-Stokes Equations and their Applications, Kyoto, Japan, 01/2006.

SIAM Conference on Analysis of Partial Differential Equations, Houston, TX, 12/2004.

## TEACHING

**Massachusetts Institute of Technology**, Cambridge, Massachusetts, USA

*Instructor* for 18.034: Honors Differential Equations, Spring 2009.

*Instructor* for 18.104: Seminar in Analysis, *Hamiltonian mechanics*, Fall 2008.

*Instructor* for 18.014 – 18.024: Calculus with Theory, Fall 2007 – Spring 2008.

*Instructor* for 18.034: Honors Ordinary Differential Equations, Spring 2007.

Course webpages are at <http://stellar.mit.edu/S/course/18/>.

*Teaching Assistant* for 18.01A/02: Calculus, Fall 2006.

**Brown University**, Providence, Rhode Island, USA

*Instructor* for Mathematics 10: Introductory Calculus II, Spring 2006.

*Grader* for Mathematics 237: Graduate Partial Differential Equations, Fall 2004.

*Grader* for Mathematics 263: Graduate Probability, Fall 2003.

*Instructor* for Mathematics 17: Advanced Placement Calculus, Fall 2003, Fall 2004.

*Teaching Assistant* for Mathematics 10: Introductory Calculus II, Fall 2002 – Spring 2003.

**Seoul National University**, Seoul, South Korea

*Teaching Assistant* for Vector Calculus, Fall 2000 – Spring 2001.

**HONORS &  
AWARDS**

**AWM Workshop Grant**, to attend and speak at SIAM Conference on Dynamical Systems, 05/2007.

**NSF-AWM Travel Grant** to attend SIAM Conference on Nonlinear Waves, \$1,500.00, 05/2006.

**NSF Research Assistantship**, Brown University, \$5,000.00, Summer 2006.

*supported by the NSF grant of Professor Walter Strauss, DMS-0405066.*

**Dissertation Fellowship**, Brown University, Graduate School, \$22,000.00. Fall 2005–Spring 2006.

**Postdoctoral Grant**, Institut Mittag-Leffler, Djursholm, Sweden, Fall 2005.

*travel grant and monthly salary of 12,000.00 SEK*

**BK21 Fellowship**, Seoul National University, Graduate School, March 2000 – May 2001.

*graduate fellowship from the Government of South Korea*

**LONG-TERM  
RESEARCH VISITS**

**Participant** for the Clay Mathematics Institute 2008 summer school on *Evolution Equations*, Eidgenössische Technische Hochschule (ETH), Zürich, Switzerland, June 23 – July 19, 2008.

**Participant** for the Woods Hole Oceanography Institute Lectures on *Boundary Layers*, Woods Hole, MA, June 18 – August 24, 2007.

**Invited residence** at Institut Mittag-Leffler for the program *Wave Motion*, Djursholm, Sweden, Fall 2005.

**SERVICES**

**Referee** for Acta Mathematica, Communications in Mathematical Sciences, Communications in Partial Differential Equations, European Journal of Mechanics - B/Fluids, Journal of Differential Equations, Journal of Fluid Mechanics, SIAM Journal of Mathematical Analysis.

**UROP** (MIT's undergraduate research opportunities program)

supervisor of Aaditya Muthukumar. The project is to create *lecture notes for 18.024*. They will be published at the OCW in January 2009. Works in progress are available at <http://math.mit.edu/~verahur/teaching.html>.

**OpenCourseWare** (free course material service of MIT)

for *18.034 Honors Differential Equations*. The project has been published at <http://ocw.mit.edu/OcwWeb/Mathematics/18-034Spring-2007/CourseHome>.

**PERSONAL  
INFORMATION**

*citizenship:* Republic of Korea.

*visa status:* H1B, valid through June 30, 2009.

**REFERENCES**

**J. Thomas Beale**, Duke University, beale@math.duke.edu

**Jerry Bona**, University of Illinois at Chicago, bona@math.uic.edu

**Adrian Constantin**, University of Vienna, Austria, adrian.constantin@univie.ac.at

**Walter Craig**, McMaster University, Canada, craig@math.mcmaster.ca

**Joachim Escher**, University of Hannover, Germany, escher@ifam.uni-hannover.de

**Thanasis Fokas**, University of Cambridge, UK, t.fokas@damtp.cam.ac.uk

**Haynes Miller**, Massachusetts Institute of Technology, hrm@math.mit.edu (teaching)

**Steve Shkoller**, University of California, Davis, shkoller@math.ucdavis.edu

**Gigliola Staffilani**, Massachusetts Institute of Technology, gigliola@math.mit.edu  
(postdoctoral mentor)

**Walter Strauss**, Brown University wstrauss@math.brown.edu (thesis advisor)

**John Toland**, University of Bath, UK, jft@maths.bath.ac.uk