ILENIA BATTIATO - CURRICULUM VITAE

CONTACT INFORMATION

ibattiat@stanford.edu

RESEARCH INTERESTS

Energy and environment (battery systems; superhydrophobicity and drag reduction; carbon sequestration); multiscale, mesoscale and hybrid simulations (multiphase and reactive transport processes); effective medium theories; perturbation methods, homogenization and upscaling.

EDUCATION

Ph.D. in Engineering Science w/spec Computational Science 2008-2010
Mechanical & Aerospace Engineering Department
University of California, San Diego

M.Sc. in Engineering Physics 2006-2008
Mechanical & Aerospace Engineering Department
University of California, San Diego

M.Sc. equivalent (5-years Laurea, Summa cum Laude) 2000-2005
Department of Environmental Engineering
Politecnico di Milano, Milano, Italy

RELEVANT EMPLOYMENTS

Assistant Professor Fa16-Current
Energy Resources Engineering Department
Stanford University, CA, USA

Adjunct Professor Wi16-Current
Mechanical Engineering Department
San Diego State University, CA, US

Adjunct Professor Su15-Current
Environmental Engineering and Earth Science Department
Clemson University, SC, USA

Adjunct Professor Fa14-Current
Computational Science Research Center
San Diego State University, CA, USA

PAST RELEVANT EMPLOYMENTS

Assistant Professor Fa14-Su16
Mechanical Engineering Department
San Diego State University, CA, USA

Assistant Professor Sp-12-Su14
Mechanical Engineering Department
Clemson University, SC, USA

Research Fellow Sp12
SAMSI (Statistical and Applied Mathematical Sciences Institute)
Research Triangle Park, NC, USA

Postdoctoral Researcher Fa10-Wi12
Max Planck Institute for Dynamics and Self-Organization (MPI-DS)
Göttingen, Germany

PhD Intern Su08, Su09
Pacific Northwest National Laboratory (PNNL)
Richland, WA, USA

Teaching Experience

Instructor {Stanford University}

ENERGY 298 (grad) - Multiscale Methods for Transport in Porous Media	Fa17
ENERGY 120 (undergrad) - Fundamentals of Petroleum Engineering	Fa17
ENERGY 222 (grad) - Advanced Reservoir Engineering	Sp17, Sp18

Instructor {San Diego State University}

ME 696 (grad) - Advanced Fluid Mechanics	Fa14
ME 200 (undergrad) - Statics	Fa14, Fa15

Instructor {Clemson University}

ME 308 (undergrad) - Fluid Mechanics	Sp13, Sp14
ME 801 (grad) - Foundations of Fluid Mechanics	Fa12, Fa13

Co-Instructor {University of Göttingen}

Environmental Fluid Dynamics (grad)	Fa11

Awards and Scholarships

2015 Department of Energy Young Investigator Award, Basic Energy Sciences Program.

2015 GREW (Grants and Research Enterprise Writing) Fellowship, Sp15, San Diego State University.

2013 Eastman Chemical Award for Excellence, ME, Clemson University

2012 'Aci e Galatea' Award to career, Acireale (CT), Italy, August 10th.

2012 Research Fellowship Award, SAMSI, Research Triangle Park, NC, USA

2009 Travel Award for 'Fluxes and Structures in Fluids: Physics of Geospheres' International Conference in Moscow, Russia.

Travel award for DOE-ERSP 4th Annual PI Meeting, Lansdowne, 2009.

2008 Outstanding Student Paper Award, AGU Fall meeting, San Francisco.

2000 Fellowship from RUI foundation - Politecnico di Milano.

Media (TV&Press) Coverage

April 2011: featured on 'Brilliant Minds' series, DW-TV Europe (April 10th 2011, 21:30 UTC). Online version available at http://www.dw.de/ilenia-battiato-italy/a-6498661

June 2012: featured on InterPore Newsletter Research Spotlight: 'Darcy-Brinkman law and nanotechnology: towards an effective medium theory of systems at the nano-scale', InterPore Newsletter 2012 (12)

August 2012: Italian Press Coverage of the 'Aci e Galatea' Award to career. Press announcement (in Italian) on La Repubblica webpage. Online version available at http://palermo.repubblica.it/dettaglio-news/17:08/4209144

May 2015: SDSU Press Center Coverage of the 'DOE Young Investigator' Award to career. Online version 'Early Career Splash for Battiato' available at http://newscenter.sdsu.edu/

August 13, 2015: Italian National Press Coverage 'La Sicilia'. Part of the article available online at: http://www.siciliainrosa.it/acireale-california-storia-ilenia-battiato/

Affiliations

American Physical Society (APS), Society of Industrial and Applied Mathematics (SIAM), American Geophysical Union (AGU), Interpore

Professional activities

Organizer, XIII Edition of Computational Methods in Water Resources (CMWR) Conference, Stanford University, 2020

Session Organizer, XII Edition of Computational Methods in Water Resources (CMWR) Conference, Saint Malo, France, 2018

Associate Editor: Hydrological Sciences Journal, Taylor & Francis

Guest Editor of Geofluids Special Issue on 'Contribution of Pore-Scale Approach to Macroscale Geofluids Modelling in Porous Media'

Referee

Physical Review Letters, Geophysical Research Letters, Journal of Fluid Mechanics, Physical Review E, SIAM (MMS) Multiscale Multiscale Modeling and Simulations, Journal of Fluids and Structures, Water Resources Research, Advances in Water Resources, Transport in Porous Media, Chemical Engineering Journal, Meccanica, Environmental Earth Sciences, Revista Mexicana de Ingenieria Quimica

National Science Foundation (NSF) panelist and ad-hoc reviewer; American Chemical Society (ACS) Petroleum Research Fund ad-hoc reviewer

Scientific Committee Member: 2016 Computational Methods in Water Resources (University of Toronto, Canada) ; 2015 9th Southern California Flow Physics Symposium (SDSU, San Diego)

Session Co-organizer: 2014 American Geophysical Union; 2014 Computational Methods in Water Resources; 2013 AGU Fall Meeting; 2013 Interpore.

Outreach activities

Hosted high school junior student Alora Cisneroz for a research internship at Stanford (2018)

Mechanical Engineering Representative 'E-magine' your future program, Clemson University, Spring (2014)

'E-magine' your future (for Middle and High schoolers), Clemson University, April 20th (2013)

'Design and Create- Girl Tech' ASME outreach activity, August 2nd (2013)

Languages

Native: Italian
Fluent: English
Conversational: Spanish

Funding History: Ongoing

09/16-09/17: PI, *A vegetative facies-based multiscale approach to modeling nutrient transport in the Columbia river Basin*; DOE SBR Research Program; $150,000 ($150,000).

01/16-12/19: SDSU PI, *Collaborative Research: DMREF: An integrated multiscale modeling and experimental approach to design fouling resistant membranes*; Division of Materials Research; $271,506 ($271,506).

06/15-05/20: PI, *Multiscale dynamics of reactive fronts in the subsurface*; DE-SC0014227; DOE Young Investigator Award, Basic Energy Sciences; $750,000 ($750,000).

10/14-09/16: External collaborator, *Hydro-Biogeochemical Process Dynamics in the Groundwater Surface Water Interaction Zone*; DOE PNNL SBR SFA; $6,203,345 ($250,700).

Funding History: Past

06/13-04/16: PI, *Collaborative Research: Hybrid Modeling of Reactive Transport in Porous and Fractured Media*, Award number: 1246297; NSF-EAR; $179,998 ($179,998).

01/15-06/16: PI, *Emergent Behavior of Micro-structured Surfaces*; University Grant Program; $7,834 ($7,834).

11/14-09/15: PI, *Emergent Behavior of Micro-structured Surfaces*; Environmental Molecular Sciences Laboratory; Equipment and in-kind support: $26,249 ($26,249).

Co-PI, *Computer Aided Design of Antifouling Membranes for Water Purification*; 2013/14 CU University Research Grant Committee (URGC) Program; Project Location: Clemson University; $10,000 (N/A).

Co-PI, *Self-Sustainable Robot Swarms by Exploring Diversity and Specialty*, 2012/2013 CU University Research Grant Committee (URGC) Program; Project Location: Clemson University; $10,000 (N/A).

(*) IB's portion in parenthesis

Publications: Refereed Journals

26. **Battiato**, I., D. O' Malley, C. T. Miller, P. S. Takhar, F. Valdes-Parada, B. D. Wood, 'Theory and Applications of Macroscopic Models', *submitted to Transp. Porous Med., (2018).*

25. D. Picchi$^{(\star)}$, Battiato, I. 'The impact of pore-scale flow regimes on upscaling of immiscible two-phase flow in porous media', *Water Resour. Res. Submission Code: 2018WR023172 (2018).*

24. F. Rajabi$^{(\star)}$, **Battiato**, I., 'Effects of Spatiotemporal Averaging on Predictions of Reactive Transport', *Water. Resour. Res., Submission Code: 2017WR021931 (2018).*

23. B. Ling$^{(\star)}$, Oostrom, M., Tartakovsky, A. M., **Battiato**, I., 'Hydrodynamic dispersion in thin porous channels with controlled microtexture', *Phys. Fluids,* ***Editor's Pick*** *(2018).*

22. J. Suckale, Z. Qin, D. Picchi$^{(\star)}$, T. Keller, **Battiato**, I., 'Bistability of buoyancy-driven exchange flows in vertical tubes', *J. Fluid Mech., Accepted, https://arxiv.org/abs/1802.01664 (2018).*

21. Korneev$^{(\star)}$, S., Xiaofan, Y., Zachara, J., Scheibe, T. D., **Battiato**, I., 'Method of segmentation with downscaling for unresolved images of a highly heterogeneous porous sample', *Water Resour. Res., 54. https://doi.org/10.1002/2018WR022886 (2018).*

20. S. Rubol$^{(\star)}$, Ling$^{(\star)}$, B., **Battiato**, I., 'Universal scaling-law for flow resistance over canopies with complex morphology', *Nature Scientific Reports, http://rdcu.be/IWn3 (2018).*

19. J. Yan$^{(\star)}$, I. **Battiato**, G. Fadel, 'Planning the Process Parameters for the Direct Metal Deposition of Functionally Graded Parts Based on Mathematical Models', *Journal of Manufacturing Processes, 31, pp. 56-71, (2018).*

18. M. Yousefzadeh$^{(\star)}$, **Battiato**, I., 'Physics-based hybrid method for multiscale transport in porous media', *J. Comput. Phys., 344, pp. 320-338, (2017).* Citations: 2.

17. B. Ling$^{(\star)}$, Bao, J., Oostrom, M., **Battiato**, I., Tartakovsky, A. M., 'Modeling variability in porescale multiphase flow experiments', *Adv. Water. Resour., 105, pp. 29-38 (2017).* Citations: 1.

16. Yan$^{(\star)}$, J., **Battiato**, I., Fadel, G., 'Design of injection nozzle in direct metal deposition (DMD) manufacturing of thin-walled structures based on 3D models', *The International Journal of Advanced Manufacturing Technology, 91 (1-4), pp. 605-616 (2017).*

15. S. Korneev$^{(\star)}$, **Battiato**, I., 'Sequential homogenization of reactive transport in polydisperse porous media', *SIAM Multiscale Model. Sim., **14**, 4, pp. 1301-1318 (2016).*

14. S. Rubol$^{(\star)}$, **Battiato**, I., De Barros, F., 'Vertical dispersion in obstructed shear flows', *Water Resour. Res., doi: 10.1002/2016WR018907 (2016).* Citations: 4.

13. B. Ling$^{(\star)}$, Tartakovsky, A. M., **Battiato**, I., 'Dispersion controlled by permeable surfaces: surface properties and scaling', *J. Fluid Mech., **801**, pp. 13-42 (2016).* Citations: 4.

12. H. Arunachalam$^{(\star)}$, Onori, S., **Battiato**, I., 'On Veracity of Lithium-Ion Battery Macroscopic Models', *J. Electrochem. Soc., **162**, 9, A1-A12, (2015).* Citations: 6.

11. Scheibe, T. D., Murphy, E. M., Chen, X., Rice, A. K., Carroll, K. C., Palmer, B. J., **Battiato**, I., and Wood B. D., 'An Analysis Platform for Multiscale Hydrogeologic Modeling with Emphasis on Hybrid Multiscale Methods', *Ground Water, **35**(1), pp.38-56, (2015).* Citations: 20.

10. **Battiato**, I., Rubol, S., 'Single-parameter model of vegetated aquatic flows', *Water Resour. Res., 50, doi:10.1002/2013WR015065, (2014).* Citations: 6.

9. **Battiato**, I., 'Effective Medium Theory for drag-reducing micro-patterned surfaces in turbulent flows', *Eur. Phys. J. E, **37**,19, (2014).* Citations: 3.

8. Papke$^{(\star)}$, A., **Battiato**, I., 'A reduced complexity model for dynamic similarity in obstructed shear flows', *Geophys. Res. Lett., 40, pp. 1-5, (2013).* Citations: 5.

7. Boso, F., **Battiato**, I., 'Homogenizability Conditions of Multicomponent Reactive Transport Processes', *Adv. Water Resour., 62, pp. 254-265, (2013).* Citations: 21

6. **Battiato**, I., 'Self-similarity in Coupled Brinkman/Navier-Stokes Flows'. *J. Fluid Mech., **699**, pp. 94-114, (2012).* Citations: 12.

5. **Battiato**, I., Vollmer, J.,'Flow-induced shear instabilities of cohesive granulates'. *Phys. Rev. E, **86**, 031301, (2012).* Citations: 1.

4. **Battiato**, I., Tartakovsky, D. M., Tartakovsky, A. M., Scheibe, T.D., 'Hybrid Models of Reactive Transport in Porous and Fractured Media'. *Adv. Water Resour., Special Issue. **43**, pp. 1140–1150, (2011).* Citations: 51

3. **Battiato**, I., Tartakovsky, D. M., 'Applicability Regimes for Macroscopic Models of Reactive Transport in Porous Media'. *J. Contam. Hydrol., **120-121**, pp.18–26, (2011).* Citations: 56.

2. **Battiato**, I., Bandaru, P. R., Tartakovsky, D. M., 'Elastic Response of Carbon Nanotube Forests to Aerodynamic Stresses'. *Phys. Rev. Lett., **105**, 144504, (2010).* Citations: 17.

1. **Battiato**, I., Tartakovsky, D. M., Tartakovsky, A. M., Scheibe T. D., 'On Breakdown of Macroscopic Models of Mixing-Controlled Heterogeneous Reactions in Porous Media'. *Adv. Water Resour., **32**, 11, pp.1664–1673, (2009).* Citations: 64.

($\star$) Postdoc or PhD/MSc student author

Publications: Book Chapters

1. **Battiato**, I., 'Multiscale models of flow and transport', in Handbook of Groundwater Engineering, Chp. 29, Eds J. H. Cushman, D. M. Tartakovsky, *CRC Press, 978-1-49-870304-8, (2016).*

2. **Battiato**, I., Tartakovsky, D. M., 'From Upscaling Techniques to Hybrid Models'. *Mathematical and Numerical Modeling in Porous Media: Applications in Geosciences, CRC Press. (2012).*

Refereed Publications: Proceedings of National and/or International Conferences

1. Picchi$^{(\star)}$, D., **Battiato** I., 'The Impact of Pore-Scale Flow Regimes on Upscaling of Immiscible Two-Phase Flow in Geothermal Reservoirs', *PROCEEDINGS, 43rd Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, February 12-14, SGP-TR-213 (2018).*

2. Ling$^{(\star)}$ B., A. Tartakovsky, M. Oostrom and I. **Battiato**, 'Dispersion in Hyperporous Fractured Systems and the Impact of Matrix Permeability on Fracture Transmissivity', *PROCEEDINGS, 43rd Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, February 12-14, SGP-TR-213 (2018).*

3. **Battiato** I., D. M. Tartakovsky, P. Cabrales, M. Intaglietta., 'Role of glycocalyx in attenuation of shear stress on endothelial cells: from in vivo experiments to microfluidic circuits', *Accepted, IEEE Transactios on Biomedical Circuits and Systems Conference, Catania, September (2017).*

4. H. Arunachalam$^{(\star)}$, S. Korneev, **Battiato** I., Onori S., 'Multiscale modeling approach to determine effective lithium-ion transport properties', *2017 American Control Conference, Seattle, May 24-26, doi: 10.23919/ACC.2017.7962936 (2017).*

5. H. Arunachalam$^{(\star)}$, **Battiato** I., Onori S., 'Preliminary Investigation of provability of Li-ion Macroscale Models subject to Capacity Fade', *9^{th} ASME Annual Dynamic Systems and Control Conference, Minneapolis, MN, October 12-14, Volume 1, Article Number: UNSP V001T08A002 (2017).*

6. J. Yan$^{(\star)}$, Masoudi N., **Battiato**, I., Fadel G., 'Optimization of process parameters in laser engineered net shaping (LENS) deposition of multi-materials', *ASME 2015 International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE 2015), Volume 1A, Article Number: V01AT02A034, Boston, August 2-5, (2015).*

7. H. Arunachalam$^{(\star)}$, Onori S., **Battiato** I., 'Temperature-dependent multiscale-dynamics in Lithium-Ion battery electrochemical models', *Proceedings of the American Control Conference, Chicago, July 1-3, pp. 305-310, (2015).* Citations: 2.

8. J. Yan$^{(\star)}$, **Battiato**, I., Fadel G., 'Optimization of multi-materials in-flight melting in laser engineered net shaping (LENS) process', *Accepted, 25th Annual International Solid Freeform Fabrication Symposium, August 4-6, (2014).*

9. Riva, M., Guadagnini, A., **Battiato** I., Sanchez-Vila, X., 'Trasporto reattivo in formazioni eterogenee con moto forzato' (Reactive transport in heterogeneous formations with radial flow field), *Atti del XXX Convegno di Idraulica e Costruzioni Idrauliche, (2006)*, Casa Editrice Universita degli Studi di Roma La Sapienza, 207 (full paper on CD-ROM).

Manuscripts in Preparation

5. S. Korneev, J. Gilles and I. Battiato, 'Multiclass nonparametric histogram-based thresholding using kernel density estimation', (2018)

4. **Battiato**, I., 'Skin friction, Kármán number, and sub-laminar drag in turbulent channel flows', to be submitted to Phys. Rev. E

3. B. Ling$^{(\star)}$, I. **Battiato**, 'Energy-based classification of liquid jets breakup dynamics', to be submitted to Phys. Rev. E

2. A. Papke$^{(\star)}$, I. **Battiato**, 'Stability of Porous Flows: Inflection Point and Dynamic Similarity', to be submitted to Geophys. Res. Lett.

1. H. Arunachalam$^{(\star)}$, S. Korneev$^{(\star)}$, S. Onori and I. **Battiato**, 'Multiscale Electrochemical Modeling and Machine Learning: Effective Transport Properties of Lithium-Ion Batteries from Microstructure Topology'

(*) MSc/PhD student or Postdoc author

Keynote/Plenary Lectures

2017

'Multiscale dynamics of reactive fronts in heterogeneous media with fluctuating forcings', *SIAM Conference on Mathematical and Computational Issues in the Geosciences, Erlangen, Germany, 11-14 September.*

International Conference on Groundwater ICGW 2017, Universidad Nacional de Colombia, Bogotá, Colombia, 28-31 August. (Invitation Declined)

Invited Presentations

2018

'TBD', *University of Southern California, Department of Civil and Environmental Engineering, 21 September.*

Oberwolfach Workshop 1835 'Reactive Flows in Deformable, Complex Media', Mathematisches Forschungsinstitut Oberwolfach, 26 August-1 September 2018.

'An effective-medium framework for flow over canopies with complex morphologies: from universal scaling to algal bloom predictions in riverine systems', *Stanford University, McCarty Lecture in Civil and Environmental Engineering, 7 May.*

'From Sequential Homogenization to Multiscale Data Reconstruction', *Oregon State University, Department of Mathematics and Department of Chemical Engineering, 2 April.*

'From Sequential Homogenization to Multiscale Data Reconstruction', *Claude R. Hocott Lecture in Petroleum Engineering, University of Texas at Austin, 19 February.*

2017

'Dispersion controlled by permeable surfaces: Surface Properties and Scaling', *Stanford University, Department of Geophysics, 9 November.*

'Energy-based upscaling of immiscible two-phase flow in porous media: flow regimes and applicability conditions', *Stanford University, Energy Resources Engineering, 9 October.*

'Sequential Homogenization of Reactive Transport in Polydisperse Porous Media', *SIAM Geosciences, 'Advances and applications of periodic and stochastic homogenisation' Minisymposium, Erlangen, Germany, 11-14 September.*

'Topological control of dispersion in patterned microchannels', *European Conference on Circuit Theory and Design, Catania, Italy, 4-6 September*

'Transport Phenomena over patterned surfaces', *University of Southern California, Los Angeles, 26 April.*

'Pore-scale, system-scale and across-scale modeling of filter media: the computational challenges in multiscale porous systems', *Advanced Filtration Technology Conference, American filtration and separation Society, Louisville, KY, 10-13 April.*

'Dispersion in Hyperporous fractured systems', *Geosciencias 2017, La Habana, Cuba, 3-7 April.*

2016

'Dispersion Controlled by Permeable Surfaces: Surface Properties and Scaling', *Clean Air and Water Solutions Conference, American Filtration Society, San Diego, 24-27 October.*

'Multi-scale Dynamics in Reactive Porous Systems for Energy Applications', *53rd Annual Technical Meeting, Society of Engineering Science, University of Maryland, 2-5 October.*

'Life in Porous Media', *Session chairwoman. Flow in Porous Media Gordon Research Conference, Girona, Spain, 31 July - 5 August.*

'Multiscale Dynamics of Transport in Li-ion Batteries and Limitations of Macroscopic Models', *'Multiscale phenomena in electrochemical and porous systems' workshop, Warwick, England, 14-16 June.*

2015

'A Multiscale Journey through Energy Systems', *Discovery Slams, San Diego State University, San Diego, CA, 20 October.* Video Available at *http://sci.sdsu.edu/slams/oct-20-15/*

'A General Multiscale Hybrid Method for Transport through Complex Porous Media', *2015 AGU Fall Meeting, San Francisco, CA, 14-18 December.*

'Tracers Transport in Aquatic Vegetated Flows' *Department of Civil Engineering, University of California Berkeley, Berkeley, CA, 18 September.*

'Multi-scale Dynamics in Energy Systems: From CO_2 Sequestration to Li-ion Batteries' *Department of Mechanical and Aerospace Engineering, University of California San Diego,*

CA, 10 June. **Faculty Candidate Seminar. Position offered.**

'Multiscale hybrid models of flow and transport through complex porous media' *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, *Stanford University, Stanford, CA, 29 June - 2 July.*

'Temperature-dependent multiscale-dynamics in Lithium-Ion battery electrochemical models' *7th International Conference in Porous Media, Interpore*, *University of Padova, Padova, Italy, 18-21 May.*

'Hybrid, Stochastic and Computational Methods - The World of Hydrological Modeling' *Summer School on Computational Multiscale Methods in Porous Media*, *GeoForschungsZentrum, Potsdam, Germany, 5 May - 8 May.*

'Multiscale Dynamics of Reactive Fronts in the Subsurface' *Energy Resources Engineering Department*, *Stanford University, Stanford, CA, 20 April - 21 April.* **Faculty Candidate Seminar.**

'Hybrid models of reactive transport in porous media' *Computational Science Research Center, San Diego State University, San Diego, CA, 23 January.*

'Transport Phenomena over Patterned Surfaces' *Mechanical and Aerospace Engineering Department*, *University of California San Diego, San Diego, CA, 12 January.*

2014

'Adaptive Hybrid Models of Reactive Transport in Porous Media' *School of Earth Sciences, Energy Resources Engineering Department, Stanford University, Stanford, CA, 3-4 November.*

'Multiscale Models of Flow and Reactive Transport in Hydrologic Systems' *'International Conference of Mathematics, Information and Computational Sciences*, *Beihang University, Beijing, China, 20-24 October.*

'Towards a Multiscale modeling framework of Lithium-Ion Battery Dynamics' *'International Center for Automotive Research*, *iCar, Clemson University, Greenville, SC, 16 October.*

Multiscale Computation: Needs and Opportunities for BER Science Workshop, *Washington, DC, 26 August.*

'Adaptive Hybrid Models of Reactive Transport in Porous Media'
Gordon Research Conference, Flow & Transport in Permeable Media, *Bates College, Lewiston, ME, 6-11 July.*

'Multiscale Models of Flow and Reactive Transport in Hydrologic Systems'
Available at: https://video.seas.harvard.edu/media/,
Harvard University, School of Engineering and Applied Sciences, Cambridge, MA, April 14. **Faculty Candidate Seminar.**

'Multiscale Modeling of Flow and Transport in Complex Structures'
Clemson University, Department of Mathematics, Clemson, SC, April 1.

'Multiscale Models of Flow and Transport in Hydrologic Systems'
University of Illinois, Urbana-Champaign, Civil and Environmental Engineering Depart-

ment, Urbana IL, Feb 14.

'Multiscale Models of Flow and Reactive Transport in Hydrologic Systems'
Faculty Candidate Seminar, *Cornell University, Biological and Environmental Engineering Department, Ithaca, NY, Feb 5.* **Faculty Candidate Seminar.**

2013

Scheibe, T. D., Murphy, E. M. , Chen, X., Rice, A. K., Carroll, K. C., Palmer, B., Tartakovsky, A. M., Battiato, I., Wood, B. D., 'Multiscale Hydrogeologic Modeling with Emphasis on Hybrid Multiscale Methods', *2013 AGU Fall Meeting*, San Francisco, CA, Dec 9-13.

'Multiscale Modeling of Flow and Transport in Complex Structures', Faculty Candidate Seminar, *San Diego State University, Mechanical Engineering Department, San Diego, CA, Dec 6.* **Faculty Candidate Seminar.**

'Hybrid Models of reactive transport in porous media'
Clemson University, Department of Environmental Science, Clemson, SC, Nov 1.

'Hybrid Models of reactive transport in porous media'
Georgia Tech, Department of Civil Engineering, Atlanta, GA, Sept 13.

'Adapative Hybrid Models of reactive transport in porous media'
SIAM Conference on Mathematical and Computational Issues in the Geosciences, Padova, Italy, June 17-20.

'Transport Phenomena over Patterned Surfaces'
Stony Brook University, Department of Mechanical Engineering, NY, May 2-3. **Faculty Candidate Seminar.**

2012

'Hybrid Models in Porous and Fractured Media'
Clemson University, Department of Mathematics, Clemson, SC, USA, October 19.

'Self-similarity in coupled Brinkman/Navier-Stokes flows'
Clemson University, Department of Physics and Astronomy, Clemson, SC, USA, October 11.

'Hybrid Models in Fractured Media'
XIX Computational Methods in Water Resources (CMWR2012) conference, University of Illinois at Urbana-Champaign, Urbana, IL, USA, June 17-21.

'Multiscale Models for Transport Processes in Complex Geometries: Applications to Porous and Granular Media'
Workshop on Models with Complex and Uncertain Domains, SAMSI, Durham, NC, March 22-23.

2011

'Transport in Porous, Fractured and Granular Media: from Nano-scale to Field-scale'
Clemson University, Dept. of Mechanical Engineering, Clemson, SC, USA, July 7. **Faculty Candidate Seminar.**

'Transport in Porous and Granular Media: from Nano- to Field-scale'
Texas A&M, Dept. of Petroleum Engineering, College Station, TX, USA, May 5.

'Hybrid Simulations of Reactive Transport in Porous Media'. *SIAM Conference on Mathematical and Computational Issues in the Geosciences(GS11), Long Beach, CA, March 21-24.*

'Hybrid Simulations of Reactive Transport in Porous and Fractured Media'. *Novel multiscale methods for porous media flow II Workshop, International Centre for Mathematical Sciences, Edinburgh, United Kingdom, February14-16.*

2010

'Hybrid Models of Reactive Transport in Crowded Environments'. *2010 AGU Fall Meeting, San Francisco, December 13-17.*

Presentations and Conferences

2018

Campos, J. A., Battiato, I., García R. E. 'Towards a Generalized Phase Transforming Porous Electrode Theory', *233rd Electrochemical Society Conference*, Seattle, WA, May 13-17.

Battiato, I., Korneev, S., 'From sequential homogenization to multiscale data reconstruction' *2018 CMWR*, Saint-Malo, France, June 3-7.

2017

Campos, J. A., Battiato, I., García R. E. 'Microstructural Limits and Extensions of Porous Electrode Theory', *232 Electrochemical Society Conference*, National Harbor, MD, October 1-6.

Korneev, S., Battiato, I., 'Sequential homogenization of reactive transport in polydisperse porous media', *InterPore 2017*, Rotterdam, Netherlands, May 8 - 11.

Korneev, S., Gilles, J., Battiato, I., 'Multiscale methods for unresolved pore-scale heterogenous samples', *InterPore 2017*, Rotterdam, Netherlands, May 8 - 11.

Ling, B., Battiato, I., 'Dispersion in hyperporous fractured systems and the impact of matrix permeability on fracture transmissivity', *InterPore 2017*, Rotterdam, Netherlands, May 8 - 11.

2016

Korneev, S., Scheibe, T. D., Yang, X., Zachara, J. M., Battiato, I., 'Method of segmentation with downscaling for unresolved images of a highly heterogeneous porous medium', *2016 AGU Fall Meeting*, San Francisco, December 14-18.

Ling$^{(\star)}$, B., Tartakosvky, A. M., Oostrom, M., Battiato, I., 'Dispersion induced by permeable surfaces', *2016 AGU Fall Meeting*, San Francisco, December 14-18.

Yousefzadeh$^{(\star)}$, M., Battiato, I. 'Adaptive Hybrid Algorithm for Flow and Transport in Porous Media', *2016 AGU Fall Meeting*, San Francisco, December 14-18.

Rajabi$^{(\star)}$, F., Battiato, I., 'Ultra-Long Time Dynamics of Contaminant Plume Mixing Induced by Transient Forcing Factors in Geologic Formations', *2016 AGU Fall Meeting*, San Francisco, December 14-18.

Korneev, S., Battiato, I., 'Applicability Conditions for sequential homogenization of reactive transport in bi-disperse porous media', *Computational Methods in Water Resources*, University of Toronto, Canada, June 20 - 24.

Korneev, S., Battiato, I., 'Sequential numerical and analytical homogenization of reactive transport in bi-disperse chemically heterogeneous porous media', *Interpore 2016*, Cincinnati, OH, May 9 - 12.

2015

Tartakovsky, A. M., Ling, B., Oostrom, M., Bao, J., Kim, K., Trask, N., Battiato, I. 'Rigorous Study on Multi-phase Dynamics in Porous Media Using Smoothed-Particle Hydrodynamics and Experiments', *2015 AGU Fall Meeting*, San Francisco, December 14-18.

Ling$^{(\star)}$, B., Oostrom, Tartakovsky, A. M., Battiato, I., 'Multiscale Dynamics in Microporous Fractured Systems: Theory and Experiments', *2015 AGU Fall Meeting*, San Francisco, December 14-18.

Rajabi$^{(\star)}$, F., Battiato, I., 'Spatio-temporal upscaling of reactive transport in porous media for ultra-long time predictions: theory and numerical experiments', *2015 AGU Fall Meeting*, San Francisco, December 14-18.

Korneev, S., Battiato, I., 'Two-level numerical and analytical homogenization of reactive transport in bi-disperse chemically heterogeneous porous media', *2015 AGU Fall Meeting*, San Francisco, December 14-18.

Rubol, S., De Barros, F., Battiato, I. 'Tracers Transport in Vegetated Aquatic Flows', *2015 EGU General Assembly*, Wien, Austria, April 12-17.

2014

Ling$^{(\star)}$, B., Tartakovsky, A. M., Oostrom, M. Battiato, I. 'Transport Dynamics over Micropatterned Surfaces', *2014 AGU Fall Meeting*, San Francisco, USA, Dec 15-19 (Poster).

Yousefzadeh$^{(\star)}$, M., Battiato, I., 'Non-intrusive hybrid model of reactive transport in chemically heterogeneous porous media', *2014 AGU Fall Meeting*, San Francisco, USA, Dec 15-19 (Poster).

Papke$^{(\star)}$, A., Battiato, I., 'Dynamic Similarity and Instability in Porous Flows', *2014 AGU Fall Meeting*, San Francisco, USA, Dec 15-19 (Poster).

Battiato, I., 'Effective Medium Theory for Drag-Reducing Micro-patterned Surfaces in Turbulent Flows', *APS-DFD*, San Francisco, USA, Nov 24-26.

Yousefzadeh$^{(\star)}$, M., Battiato, I., 'Non-intrusive hybrid models of reactive transport in fractured media', *XX International Conference in Computational Methods in Water Resources*

2014 (CMWR2014), Stuttgart, Germany, 10-13 June.

Scheibe, T. D., Battiato, I., 'Multiscale Modeling Concepts', *PNNL SFA Hydro-Biogeochemical Process Dynamics in the Groundwater-Surface Water Interaction Zone Triennial Review, Potomac, MD, 8-9 May.*

2013

Papke$^{(\star)}$, A., Battiato, I, 'A reduced complexity model for dynamic similarity in obstructed shear flows' *2013 AGU Fall Meeting*, San Francisco, USA, Dec 9-13 (poster).

'Effective Medium Theory for Drag Reducing Surfaces in Turbulent Flows', *2013 AGU Fall Meeting*, San Francisco, USA, Dec 9-13 (Poster).

Rubol, S., Battiato, I, 'Analytical Model for Vegetated Aquatic Flows' *2013 AGU Fall Meeting*, San Francisco, USA, Dec 9-13 (poster).

Yousefzadeh$^{(\star)}$, M., Battiato, I, 'Non-intrusive hybrid coupling of reactive flow in fractured media' *2013 AGU Fall Meeting*, San Francisco, USA, Dec 9-13 (poster).

'Effective Medium Theory for Drag Reducing Surfaces in Turbulent Flows', *APS-DFD*, Pittsburg, USA, Nov 24-26.

Yousefi$^{(\star)}$, A., Battiato, I., 'Pressure Driven Turbulent Flow in a Channel With Superhydrophobic Riblets' *APS-DFD*, Pittsburg, USA, Nov 24-26 (poster).

Ling$^{(\star)}$, B., Battiato, I., 'Energy-based Classification of Liquid Jet Dynamics' *APS-DFD*, Pittsburg, USA, Nov 24-26 (poster).

2012

'Adaptive Hybrid Models of reactive transport in porous media', *2012 AGU Fall Meeting*, San Francisco, USA, Dec 3-7.

Rubol, S., Battiato, I., 'Coupled Brinkman-Reynolds equations for turbulent flows over submerged vegetation', *2012 AGU Fall Meeting*, San Francisco, USA, Dec 3-7 (Poster).

'Self-similarity in coupled Brinkman\Navier-Stokes flows', *65th Annual Meeting APS-DFD*, San Diego, USA, Nov 18-20.

Papke$^{(\star)}$, A., Battiato, I. 'On Self-Similarity of Turbulent Flows over Porous Media' *65th Annual Meeting APS-DFD*, San Diego, USA, Nov 18-20 (poster).

'Effects of Glycocalyx on Attenuation of Shear Stress on Endothelial Cells', *4th International Conference on Porous Media (Interpore) of the International Society for Porous Media, Purdue University, West Lafayette, Indiana, USA, May 14-16.*

'Elastic Response of Carbon Nanotube Forests to Aerodynamic Stresses' *2012 Materials Research Society (MRS) Spring Meeting, San Francisco, April 9-13.*

'Hybrid models of reactive transport in porous and fractured media', *Universidad Politecnica de Catalunya, Barcelona, Spain, January 12.*

2011

Battiato, I., Vollmer J., 'Fluidization of wet granulates under hydrodynamic stresses'. *DPG Spring Meeting, German Physical Society, Dresden, Germany, March 14-18.*

2010

'Bridging scales: from upscaling techniques to hybrid models'. *CNRS, Montpellier, France, November 19.*

'Hybrid Models of Reactive Transport in Crowded Environments'. *Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany, October 8.*

'Hybrid Models of Reactive Transport in Crowded Environments'. *PhD Defense, University of California, San Diego, September 13.*

Battiato, I., Tartakovsky, D. M., 'Hybrid Simulations of Reactive Transport in Porous Media'. *XVIII International Conference on Computational Methods in Water Resources, CMWR 2010, Barcellona, Spain, June 21-24.*

Battiato, I., Bandaru, P. R., Tartakovsky, D. M., 'Elastic Response of Carbon Nanotube Forests to Aerodynamic Stresses'. *Research Expo, University of California, San Diego, April 15. Poster.*

2009

Battiato, I., Tartakovsky, D. M., 'Upscaling of Nonlinear Reactive Transport via Multiple-Scale Expansions'. *2009 AGU Fall Meeting, San Francisco CA, December 14-18.*

Battiato, I., 'Upscaling Techniques and Hybrid Models of Reactive Transport in Porous Media', *8th North American Workshop on Applications of the Physics of Porous Media, Ensenada, Baja California, Mexico, October 9-12.*

Battiato, I., Tartakovsky, D. M., Tartakovsky, A. M., 'Breakdown of Macroscopic Models of Reactive Transport In Porous Media', *Fluxes and Structures in Fluids: Physics of Geospheres, Moscow, June 24-27.*

Battiato, I., Tartakovsky, A. M., Tartakovsky, D. M., Scheibe T. D., 'Mixing-Induced Precipitation Phenomena: Range of Applicability of Macroscopic Equations', *DOE-ERSP Annual PI Meeting, Lansdowne VA, April 20-23. Poster.*

Battiato, I., Tartakovsky, D. M., 'Macroscopic Models of Reactive Transport In Porous Media', *3rd Southern California Symposium On Flow Physics, San Diego CA, April 19.*

2008

Battiato, I., Tartakovsky, A. M., Tartakovsky, D. M., Scheibe T. D., 'Mixing-Induced Precipitation Phenomena: Range of Applicability of Macroscopic Equations', *2008 AGU Fall Meeting, San Francisco CA, December 15-19. Poster.*

Water Resources System Analysis: The Contributions of William Yeh, A Symposium at UCLA, Los Angeles CA, December 12-13.

Battiato, I., 'Hybrid Models for Reactive Transport in Porous Media', *Advancement to Candidacy Exam, University of California, San Diego, November 5.*

Battiato, I., Tartakovsky, A., Tartakovsky, D., 'Homogenization Techniques for Reactive Transport in Porous Media', *GRA 17th Annual Groundwater Conference and Meeting, Costa Mesa, CA, September 25-26.*

DOE Summer School in Multiscale Mathematics and High Performance Computing, Hosted by Pacific Northwest National Laboratory, Richland, WA, August 4-6.

UC-ANR Water Resources Coordinating Conference, Heidrick Ag History Center, Woodland, CA, April 17.

References

Prof. John H. Cushman
University Distinguished Professor of Earth and Atmospheric Science &
Professor of Mathematics
jcushman@math.purdue.edu
Purdue University
West Lafayette, IN

Prof. Eric Lauga
e.lauga@damtp.cam.ac.uk
Department of Applied Mathematics and Theoretical Physics (DAMPT)
University of Cambridge
Cambridge, UK