

BAMDAD HOSSEINI

Computing and Mathematical Sciences
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Male
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EDUCATION

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- Ph.D. in Applied and Computational Mathematics, Simon Fraser University (SFU), Burnaby, Canada. 2013-2017
Thesis: "Finding beauty in the dissonance: analysis and applications of Bayesian inverse problems"
(Supervisors: Profs. John M. Stockie and Nilima Nigam)
 - M.Sc. in Applied and Computational Mathematics, SFU, Burnaby, Canada. 2011–2013
Thesis: "Dispersion of pollutants in the atmosphere: A numerical study"
(Supervisor: Prof. John M. Stockie)
 - B.Sc. in Mechanical Engineering, Sharif University of Technology, Tehran, Iran. 2006–2011
Thesis: "Simulating electrophoresis of dilute polymer solutions with Dissipative Particle Dynamics"
(Supervisor: Prof. Mohammad Said Saidi)

ACADEMIC EXPERIENCE

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- Von Kármán Instructor in Computing and Mathematical Sciences, California Institute of Technology (Caltech), Pasadena, USA. Jan 2020–Sep 2020
(Sponsor: Prof. Andrew M. Stuart)
 - Postdoctoral Fellow, Department of Computing and Mathematical Sciences, CalTech, Pasadena, USA. Jan 2018–Jan 2020
(Supervisor: Prof. Andrew M. Stuart)

PUBLICATIONS

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- [1] Juan G. García, Bamdad Hosseini, and John M. Stockie. "Simultaneous model calibration and source inversion in atmospheric dispersion models" (2018). *Submitted to Pure and Applied Geophysics*. URL: <https://arxiv.org/abs/1806.05744>.
 - [2] Bamdad Hosseini et al. "A Bayesian approach for estimating acoustic aberrations in high intensity focused ultrasound treatment" (2017). *Communications in Computational Physics (In press)*. URL: <http://arxiv.org/abs/1602.08080>.
 - [3] Bamdad Hosseini. "A Metropolis-Hastings algorithm for posterior measures with self-decomposable priors" (2018). *Submitted to SIAM/ASA JUQ*. URL: <https://arxiv.org/abs/1804.07833>.
 - [4] Bamdad Hosseini. "Well-posed Bayesian inverse problems with infinitely divisible and heavy-tailed prior measures". *SIAM/ASA Journal on Uncertainty Quantification* 5 (1 2017), pp. 1024–1060. DOI: [10.1137/16M1096372](https://doi.org/10.1137/16M1096372).
 - [5] Bamdad Hosseini and Nilima Nigam. "Well-posed Bayesian inverse problems: priors with exponential tails". *SIAM/ASA Journal on Uncertainty Quantification* 5 (1 2017), pp. 436–465. DOI: [10.1137/16M1076824](https://doi.org/10.1137/16M1076824).

- [6] Bamdad Hosseini and John M Stockie. “Estimating airborne particulate emissions using a finite-volume forward solver coupled with a Bayesian inversion approach”. *Computers and Fluids* 154 (2017), pp. 27–43. DOI: 10.1016/j.compfluid.2017.05.025.
- [7] Bamdad Hosseini and John M. Stockie. “Bayesian estimation of airborne fugitive emissions using a Gaussian plume model”. *Atmospheric Environment* 141 (2016), pp. 122–138. DOI: 10.1016/j.atmosenv.2016.06.046.
- [8] Bamdad Hosseini, Nilima Nigam, and John M. Stockie. “On smooth regularizations of the Dirac delta distribution”. *Journal of Computational Physics* 305 (2016), pp. 423–447. DOI: 10.1016/j.jcp.2015.10.054.
- [9] Bamdad Hosseini and Roohollah Hashemi. “Solution of Burgers’ equation using a local-RBF meshless method”. *International Journal for Computational Methods in Engineering Science and Mechanics* 12 (1 2011), pp. 44–58. DOI: 10.1080/15502287.2010.540303.

FELLOWSHIPS AND SCHOLARSHIPS

<ul style="list-style-type: none"> • Postdoctoral Fellowship <p style="margin-left: 2em;"><i>Ranked first amongst 44 candidates in the Mathematical Sciences committee. Valued at 90,000\$ over two years.</i></p>	NSERC	2018–2020
<ul style="list-style-type: none"> • Michael Stevenson Graduate Scholarship <p style="margin-left: 2em;"><i>Awarded to one Ph.D. student every year valued at 27,000\$.</i></p>	SFU	2016–2017
<ul style="list-style-type: none"> • Department of Mathematics Graduate Scholarship 	SFU	Sep 2016
<ul style="list-style-type: none"> • President’s Ph.D. Scholarship 	SFU	Jan 2016
<ul style="list-style-type: none"> • Department of Mathematics Graduate Scholarship 	SFU	May 2015
<ul style="list-style-type: none"> • Nominated for the Vanier Canada Graduate Scholarship 	SFU	Nov 2014
<ul style="list-style-type: none"> • Special Graduate Entrance Scholarship 	SFU	Sep 2013
<ul style="list-style-type: none"> • Department of Mathematics Graduate Scholarship 	SFU	May 2013

AWARDS AND RECOGNITIONS

<ul style="list-style-type: none"> • Governor General’s Academic Gold Medal, SFU <p style="margin-left: 2em;"><i>The Governor General’s Gold Medal is awarded to the two top graduate students at SFU in each graduating class.</i></p>		Jun 2018
<ul style="list-style-type: none"> • Quirks & Quarks Graduate Award for Best PhD Thesis, SFU <p style="margin-left: 2em;"><i>The Quirks & Quarks Graduate Award for Best PhD Thesis is awarded annually to one graduating Ph.D. student in at SFU.</i></p>		Jun 2018
<ul style="list-style-type: none"> • SIAM Student Paper Prize for “Well-posed Bayesian inverse problems: priors with exponential tails” [5]. <p style="margin-left: 2em;"><i>The SIAM Student Paper Prize is awarded annually to up to three student author(s) of outstanding papers accepted by SIAM journals.</i></p>		Jul 2017
<ul style="list-style-type: none"> • Runner Up Prize for the Student Presentation in a Special Session award, AMMCS-CAIMS Congress, Waterloo, Canada. 		Jun 2015
<ul style="list-style-type: none"> • Best Poster Award, Symposium on Mathematics and Computation, SFU, Burnaby, Canada. 		Aug 2014
<ul style="list-style-type: none"> • SIAM Student Chapter Certificate of Recognition. 		Sep 2014

SUPERVISION EXPERIENCE

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- Rupesh Jeyaram, B.Sc,Jun 2018– Aug 2018

Rupesh was a summer undergraduate research fellow (SURF) student at Caltech that I co-supervised with Profs. Andrew Stuart and Tapio Schneider. Rupesh's project concerns online parameter estimation in chaotic dynamical systems by means of ensemble Kalman inversion algorithms and the choice of sufficient statistics.

- Jonathan P. Rosser, B.Sc,Jun 2018– Aug 2018

Jonathan was also a SURF student at Caltech that I co-supervised with Profs. Andrew Stuart and Tapio Schneider. Jonathan worked on parameter estimation and uncertainty quantification in chaotic dynamical systems using Gaussian process emulators.

- Juan García, M.Sc, *Thesis: Parameter estimation and uncertainty quantification applied to advection-diffusion problems arising in atmospheric source inversion.*2015–2017

Juan was a masters student at SFU that I co-supervised with Prof. John M. Stockie. I defined Juan's thesis project and had weekly one-on-one meetings with him. I helped Juan navigate the literature and overcome mathematical and technical issues in his work.

TEACHING EXPERIENCE

• Introduction to PDEs	Lecturer	Caltech	Fall 2018
• Numerical Analysis I	Lecturer	SFU	Summer 2017
• Computational Workshop Coordinator	Instructor	SFU	Fall 2016
• Computational Workshop Coordinator	Instructor	SFU	Spring 2016
• Computational Workshop Coordinator	Instructor	SFU	Fall 2015
• Intro. to. Math. Methods in Physics	TA	SFU	Fall 2014
• Numerical Analysis I	TA	SFU	Fall 2014
• Numerical Analysis I	TA	SFU	Summer 2014
• Numerical Analysis I	TA	SFU	Spring 2013
• Numerical Analysis I	TA	SFU	Spring 2012
• Calculus Workshop	TA	SFU	Fall 2012
• Calculus Workshop	TA	SFU	Spring 2011
• Calculus Workshop	TA	SFU	Fall 2011

RESEARCH FUNDING AND GRANT APPLICATIONS

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- Mitacs-Accelerate graduate research internship program\$ 30,000Mitacs and Teck Resources Ltd.2013–2014

INVITED TALKS

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- “Continuum limit of semi-supervised learning and spectral clustering on graphs”, Mathematical Foundations of Data Science, University of British Columbia, Vancouver, Canada. Aug 2018
 - “Function space MCMC for posteriors with non-Gaussian priors”, CAIMS 2018, Ryerson University, Toronto, Canada. Jun 2018
 - “A Metropolis-Hastings algorithm for posterior measures with self-decomposable priors”. SOCAMS 2018, University of California Santa Barbara, Santa Barbara, USA. Apr 2018
 - “Non-Gaussian priors in Bayesian inverse problems: from theory to applications”. CMX Seminar Series, Caltech, Pasadena, USA. Jan 2018
 - “Non-Gaussian priors in Bayesian inverse problems: from theory to applications”. SCAIM Seminar Series, University of British Columbia, Vancouver, Canada. Oct 2017
 - “Well-posed Bayesian inverse problems: Priors with exponential tails”. SIAM Annual Meeting, Pittsburgh, USA. Jul 2017
 - “Well-posed Bayesian inverse problems beyond Gaussian priors”. Applied Inverse Problems, Hangzhou, China. May 2017
 - “An MCMC algorithm for Bayesian inference with self-decomposable priors”. CASCADE RAIN, Vancouver, Canada. Apr 2017
 - “Bayesian inverse problems with infinitely divisible priors”. SIAM Conference on Computational Science and Engineering, Atlanta, USA. Mar 2017
 - “Well-posed Bayesian inverse problems: beyond Gaussian priors”. Center for Computational Geoscience and Optimization, ICES, Austin, USA. Sep 2017
 - “Bayesian estimation of acoustic aberrations in high intensity focused ultrasound treatment”. CAIMS Annual Meeting, Edmonton, Canada. Jun 2016
 - “Smooth regularizations of the Dirac delta distribution”. AMMCS-CAIMS Congress, Waterloo, Canada. Jun 2015
 - “Estimating fugitive emissions of airborne particulates using a Gaussian plume model”. AMMCS-CAIMS Congress, Waterloo, Canada. Jun 2015

ORGANIZED EVENTS AND VOLUNTEER SERVICE

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| • Recent Advances in Scientific Computing Mini-symposium | CAIMS2018 | Jun 2018 |
| • Applicable Analysis Seminar Series | SFU | 2016–2017 |
| • Graduate Mathematical Modelling in Industry Workshop | PIMS/UBC | Aug 2016 |
| • Careers in Math Seminar | SFU | Feb 2014 |
| • Software Carpentry Bootcamp | SFU | Feb 2014 |
| • Finite Element Modelling Workshop | SFU | Feb 2014 |

PROFESSIONAL MEMBERSHIPS

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| • Member | American Statistical Association (ASA) | since 2015 |
| • Member | Society for Industrial and Applied Mathematics (SIAM) | since 2011 |
| • Member | American Mathematical Society (AMS) | since 2011 |
| • President | SIAM student chapter at Simon Fraser University | 2011–2015 |

ATTENDED WORKSHOPS AND CONFERENCES

• Uncertainty Quantification Summer School	University of Southern California, Los Angeles, USA	Aug 2018
• Mathematical Foundations of Data Science	University of British Columbia, Vancouver, Canada	Aug 2018
• CRISM Summer School in Computational Statistics	LMS, University of Warwick, Coventry, United Kingdom	Jul 2018
• SIAM Conference on Uncertainty Quantification	Garden Grove, USA	Apr 2018
• Inverse Problems and Machine Learning	CMX, Caltech, Pasadena, USA	Feb 2018
• Short Course on PDEs with Deal.II	PIMS, UBC, Vancouver, Canada	Aug 2016
• Introduction to Uncertainty Quantification	IMA, Minneapolis, U.S.A	Jun 2015
• MASDOC/EQUIP Workshop on Bayesian Inverse Problems	University of Warwick , Coventry, United Kingdom	Jun 2015
• SIAM Conference on Computational Science and Engineering	Utah, USA	Mar 2015
• Inverse Problems from Theory to Applications	Bristol, United Kingdom	Aug 2014
• Fields-Mprime Industrial Problem Solving Workshop	Fields institute, Toronto, Canada	Aug 2014

JOURNAL REVIEWING

• Inverse Problems	IOPscience
• Mathematical Review	AMS
• SIAM/ASA Journal on Uncertainty Quantification	SIAM/ASA
• Journal of Engineering Mathematics	Springer
• Computer Methods in Applied Mechanics and Engineering	Elsevier
• Atmospheric Environment	Elsevier
• Journal of Hazardous Materials	Elsevier
• Journal of Environmental Chemical Engineering	Elsevier
• International Journal of Environmental Science and Technology	Springer

SOFTWARE EXPERTISE

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- Programming languages and environments: MATLAB, C++, Fortran, Python, R.
 - Scientific computing packages: Deal.II, FreeFem++, CLAWPACK, CVX, SPGL1, Rice Wavelet Toolbox, Chebfun.