# Curriculum Vitae: Hatef Dastour, PhD

📍 Address:   Calgary, AB, Canada
🔗 Website:   [hatefdastour.github.io](hatefdastour.github.io)
in LinkedIn:  [linkedin.com/in/hatefdastour](linkedin.com/in/hatefdastour)
○ Github:    [github.com/HatefDastour](github.com/HatefDastour)

## Education

- Ph.D., Mathematics and Statistics,
  University of Calgary

  📅 January 2016 - December 2019,
  📍 Calgary, Canada,

- M.S., Applied Mathematics,
  Damghan University

  📅 September 2010 - September 2012,
  📍 Damghan, Iran,

- B.S., Applied Mathematics,
  Payame Noor University

  📅 September 2006 - July 2010,
  📍 Tehran, Iran,

## Research Interests

Big data analysis, mathematical modeling, scientific computations, and numerical analysis, and data science

## Working, Teaching and Research Experience

- Sessional Instructor                                            📅 August 2022 - Present,
  Department of Mathematics & Computing, Mount Royal University, Calgary, AB, Canada

  **Winter 2023:**
  - MATH 2233 – Statistics for Biological Sciences
  - MATH 2234 – Concepts of Mathematical Statistics

  **Fall 2022:**
  - MATH 1203 – Linear Algebra for Scientists and Engineers - Fall 2022
  - MATH 3101 – Numerical Analysis - Fall 2022
  - Course coordinator and instructor for MATH 3101. I was responsible for all course activities.
  - Instructor for MATH 1203. I was responsible for all course activities except Final examinations. The course has three lectures with a common textbook and a common final examination.

- Research Associate                                              📅 May 2022 - Present,
  Department of Geomatics Engineering, Schulich School of Engineering, University of Calgary, Alberta, Canada

  - Change detection project within remote sensing satellite data with applications in Athabasca River Basin and across Canada.

- Sessional Lecturer I/Tutorial instructor                        📅 August 2021 - Present,
  Department of Mathematics & Computer Science, Faculty of Arts & Science, University of Lethbridge (Calgary Campus), Calgary, AB, Canada

  **Fall 2021 - Fall 2022:**

  - Co-Instructor for MATH1510Y – Calculus for Management and Social Sciences
  - Preparing and delivering some sessions of MATH1510Y (Calculus for Management and Social Sciences) Lecture 01.

- Preparing, delivering, and grading of MATH1510Y (Calculus for Management and Social Sciences) Tutorial 01. The labs are focused on the usage of MS Excel and its application in business data analysis.

- Data Scientist/Research Scientist                          📅 July 2020 - Present,
  Earth & Space Inc., Calgary, AB, Canada

  - Working on Alberta climate data and drawing compassion with other data-sets
  - Developed an algorithm for water surface dynamics of the lakes of Alberta using remote sensing data
  - Preparing and writing scientific papers
  - Developing machine learning and deep learning model for natural geo-phenomena
  - Performing data analytic methods
  - Investigating and implementing various deep learning and computer vision tools for improving the currently available methods.
  - Providing data science-based consultations to clients and partner companies.

- Research Associate                          📅 November 2021 - March 31, 2022,
  Department of Geomatics Engineering, Schulich School of Engineering, University of Calgary, Alberta, Canada

  - Analyzing and modeling remote sensing data
  - Performing data analytic methods

- Data Science Developer, Full-Time                          📅 January 2020 - March 25, 2020,
  StellarAlgo Corp., Calgary, AB, Canada
  Due to the COVID19 pandemic, StellarAlgo terminated the contract of all of its Data Scientists on March 25, 2020.

  - Designing, developing, and refining predictive models for selected business verticals.
  - Discovering and communicating relevant insights to key stakeholders for smarter decision-making.
  - To explore opportunities for combining existing and new data sources to discover insights.
  - Supporting requirements gathering and data engineering efforts related to building analytics data sets.
  - Supporting the product team with analytics.
  - Programming according to project plans (versions, sprints).
  - Participating in data analysis and data architecture direction with valuable client-facing development insights.
  - Collaborating with the team designers to create interfaces.

- Sessional Instructor
  Department of Mathematics and Statistics, University of Calgary, Calgary, AB, Canada

  - **Spring 2019:** MATH 211 - Linear Methods I - Spring 2019
  - **Summer 2018:** MATH 211 - Linear Methods I - Summer 2018
  - **Fall 2017:** MATH 275 - Calculus for Engineers and Scientists - Fall 2017 (Through Instructor Training Program)

- Graduate Teaching Assistant                          📅 January 2016 - December 2019,
  Department of Mathematics and Statistics, University of Calgary, Calgary, AB, Canada

  I have gained teaching experience by doing a graduate teaching assistant for a variety of courses. These courses are Introductory Calculus (MATH 249), University Calculus I (MATH 265), Calculus for Engineers and Scientists (MATH 275), Multivariable Calculus for Engineers (MATH 277), Differential Equations for Engineers and Scientists (MATH 375), Numerical Analysis I (MATH 391), Numerical Analysis I (AMAT 491) and Numerical Analysis II (AMAT 493).

- Graduate Student                          📅 January 2016 - December 2019
  Department of Mathematics and Statistics, University of Calgary, Calgary, AB, Canada

  Developed several robust and higher-order finite difference methods for the wave equation in both frequency and time domains.

- Research Associate　　　　　　　　　　　　　　　　　　📅 February 2012 - May 2015,
  School of Mathematics, Iran University of Science and Technology, Iran

  Developed numerical methods using the Mollification method and the Marching scheme to estimate unknown parameters in inverse heat conduction problems.

- Graduate Student　　　　　　　　　　　　　　　　　　📅 October 2010 - August 2012,
  School of Mathematics and Computer science, Damghan University, Iran

  Developed some numerical schemes based on the application of the Marching scheme and the Mollification method for finding the stable numerical solution of a class of semi-linear Cauchy problems.

- Self-employed Mathematics Tutor　　　　　　　　　　　📅 October 2010 - August 2015,
  Tehran, Iran

## Publication Under Review

1. **H. Dastour**, A. Gupta, G. Achari, and Q. K. Hassan. A robust regime shift change detection algorithm for water-flow dynamics. *Under review by a Hydrology Journal*, 2022.

2. M. S. Zaghloul, E. Ghaderpour, **H. Dastour**, A. Gupta, G. Achari, and Q. K. Hassan. Impact of climate change and land cover variation on the Athabasca river flow: A multivariate regression and wavelet analysis approach. *Under review by Journal of Hydrometeorology - American Meteorological Society*, 2022.

## Journal Publications

1. M. S. Zaghloul, E. Ghaderpour, **H. Dastour**, B. Farjad, A. Gupta, H. Eum, G. Achari, and Q. K. Hassan. Long term trend analysis of river flow and climate in northern Canada. *Hydrology*, 11:197, 2022.

2. **H. Dastour**, E. Ghaderpour, M. S. Zaghloul, B. Farjad, A. Gupta, H. Eum, G. Achari, and Q. K. Hassan. Wavelet-based spatiotemporal analyses of climate and vegetation for the Athabasca river basin in Canada. *Under review by International Journal of Applied Earth Observation and Geoinformation*, 114:103044, 2022

3. **H. Dastour**, E. Ghaderpour, and Q. K. Hassan. A combined approach for monitoring monthly surface water/ice dynamics of Lesser Slave Lake via Earth observation data. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 15:6402–6417, 2022.

4. **H. Dastour** and W. Liao. A generalized optimal fourth-order finite difference scheme for a 2D Helmholtz equation with the perfectly matched layer boundary condition. *Journal of Computational and Applied Mathematics*, 394:113544, 2021.

5. **H. Dastour** and W. Liao. An optimal 13-point finite difference scheme for a 2D Helmholtz equation with a perfectly matched layer boundary condition. *Numerical Algorithms*, 86(3):1109–1141, 2021.

6. **H. Dastour** and W. Liao. A fourth-order optimal finite difference scheme for the Helmholtz equation with PML. *Computers & Mathematics with Applications*, 78(6):2147–2165, 2019.

7. W. Liao, P. Yong, **H. Dastour**, and J. Huang. Efficient and accurate numerical simulation of acoustic wave propagation in a 2d heterogeneous media. *Applied Mathematics and Computation*, 321:385–400, 2018.

8. M. Garshasbi and **H. Dastour**. A mollified marching solution of an inverse ablation-type moving boundary problem. *Computational and Applied Mathematics*, 35(1):61–73, 2016. [1]

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[1]It was customary in my country of origin, Iran, to see graduate students' names after the name of their supervisor(s) on research papers.

9. M. Garshasbi and **H. Dastour**. Estimation of unknown boundary functions in an inverse heat conduction problem using a mollified marching scheme. *Numerical Algorithms*, 68(4):769–790, 2015.[1]

10. M. Garshasbi and **H. Dastour**. Proportional factors estimation in an IHCP. *Journal of Hyperstructures*, 3(1), 2014.[1]

11. M. Garshasbi, **H. Dastour**, and M. Jalalvand. A stable numerical solution of an inverse moving boundary problem of heat conduction using discrete mollification approach. *Journal of Advanced Mathematical Modeling*, 2(1):47–60, 2012.[1]

12. M. Garshasbi, P. R. Ardabili, and **H. Dastour**. A stable numerical solution of a class of semi-linear cauchy problems. *Journal of Advanced Research in Dynamical and Control Systems*, 4:56–67, 2012.[1]

## Computer Skills

- Proficiency with computer programming including MATLAB, Python (TensorFlow, PyTorch, Keras, Scikit-Learn, NLP, Pandas, Dask...), R, Julia Programming, and others.
- Proficiency with SQL Server Analysis Services (SSAS).
- Proficiency with visualization tools such as Plotly, Power BI, etc.
- Proficiency with office applications, such as Microsoft Office, LATEX editors, and more.
- Proficiency with advanced graphical applications, such as Adobe Photoshop, 3D Studio Max, Blender 3D, and more.
- Proficiency with Microsoft Windows, mac-OS, and various Linux distributions.

## Group Projects

- 2016 Graduate Mathematical Modelling in Industry Workshop, University of British Columbia, Vancouver, BC, Canada, August 08, 2016 - August 13, 2016,

  Project: Modelling the performance of the rechargeable Li-Ion batteries,

- 2016 Industrial Problem Solving Workshop, University of Toronto, Toronto, ON, Canada, August 15, 2016 - August 19, 2016,

  Project: How to combine two relative rankings of credit risk into one ranking?
  by Internal Ratings Management, Global Risk Management, Scotiabank.

## Scholarships

- Scholarships at University of Calgary:
  - PIMS Doctoral Recruitment Scholarship. Amount: 10,000.00 C\$                 2015 - 2016
  - Eric Milner Graduate Scholarship. Amount: 5,500.00 C\$                 2016 - 2017
  - Alberta Innovates Graduate Student Scholarship. Amount: 31,500.00 C\$   2017 - 2018
  - Alberta Innovates Graduate Student Scholarship. Amount: 31,500.00 C\$   2018 - 2019
- Travel Awards:
  - 2016 CMS Summer Meeting, University of Alberta, Edmonton, AB         June 2016
  - 2016 Graduate Mathematical Modelling in Industry Workshop, Vancouver, BC   August 2016
  - 2016 Industrial Problem Solving Workshop, Toronto, ON         August 2016

## Selected Presentations

1. H. Dastour, "Computational Methods for Solving Wave Equation Inverse Problem", Eric Milner Colloquium, University of Calgary, Calgary, AB, Canada, October 14, 2016 (Colloquium Presentation).

2. H. Dastour, "A stabilized marching scheme for solving the inverse problem of degenerate diffusion model", the Canadian Society of Applied and Industrial Mathematics (CAIMS 2016), University of Alberta, Edmonton, AB, Canada, June 28, 2016 (Conference Presentation).

3. H. Dastour, "A numerical estimation approach for an inverse heat conduction problem", 2016 CMS Summer Meeting, University of Alberta, Edmonton, AB, Canada, June 24, 2016 (Conference Presentation).

4. H. Dastour, "A Computational Method for Solving an Inverse Heat Conduction Problem", 2016 CMS Summer Meeting, University of Alberta, Edmonton, AB, Canada, June 25, 2016 (Conference Poster Presentation).

5. H. Dastour, "A mollified marching solution of an inverse degenerate diffusion problem in petroleum reservoir", Alberta Mathematics Dialogue 2016, Mount Royal University, Calgary, AB, Canada, April 29, 2016 (Conference Presentation).

# Awards and Distinctions

- Certificate of Appreciation for having made valuable contributions to the June 2016 Convocation Ceremonies, 📅 June 2016.
- Recognition of the Completion of the Instructional Skills Workshop (ISW), 📅 September 2016,
- Recognition of outstanding efforts and accomplishments on behalf of the SIAM Chapter at the University of Calgary, Canada 📅 May 2017,

# Professional Services and Committees

- Student researcher speaker in the open educational resource videos for Taylor Institute for Teaching and Learning, University of Calgary
  📍 Calgary, Canada 📅 October 2019

- Committee member of the Department of Mathematics and Statistics Graduate committee, University of Calgary
  📍 Calgary, Canada 📅 October 2016 - September 2018

- Contribution to 2018 Industrial Problem Solving Workshop (IPSW), University of Calgary
  📍 Calgary, Canada 📅 August 19, 2018 - August 24, 2018

- Served as a member of the Department of Mathematics and Statistics Head Search Committee, University of Calgary
  📍 Calgary, Canada 📅 March 2018

- Instructor of Programming Workshop at 2017 CMS Math Camp (Alberta), University of Calgary
  📍 Calgary, Canada 📅 July 2017

- Contribution to the June 2016 convocation ceremonies, University of Calgary
  📍 Calgary, Canada 📅 June 2016

- The vice-president academic of Graduate University Mathematics Society (GUMS), University of Calgary
  📍 Calgary, Canada 📅 September 2016 - September 2018

- The founder and president of University of Calgary SIAM Student Chapter, University of Calgary
  📍 Calgary, Canada 📅 January 2017 - September 2018

- Organizer of the University of Calgary Chapter of SIAM Biweekly Seminar Series
  📍 Calgary, Canada 📅 February 2017 - April 2018

- Organizer of Calgary Applied and Industrial Mathematical Sciences Conference
  📍 Calgary, Canada 📅 May 21, 2017 - May 22, 2017

## Languages

English and Persian (Farsi)