CURRICULUM VITAE

Ebrahim Ghaderpour

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🔗 github.com/Ghaderpour/
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SUMMARY

- My research interest mainly revolves around big data analytics, particularly satellite and climate data analytics. I enjoy exploring our universe via analyzing data acquired from various sources – from monitoring atmosphere, water- and land-cover dynamics to study star systems and galaxies

- My teaching interest has been mainly focused on the area of applied mathematics and data science

- I enjoy giving service to the scientific community, such as supervising and training, marking exams, reviewing journal articles, hosting seminars and workshops

I. EDUCATION

**Doctor of Philosophy	Big Data Analytics	Exceptional PhD**	October 2018
York University	Toronto, ON
Teaching Certificate	September 2016
Taylor Institute, University of Calgary	Calgary, AB
**Doctor of Philosophy	Theoretical and Computational Science**	May 2014
University of Lethbridge	Lethbridge, AB
**Master of Science	Mathematics**	2010
Isfahan University of Technology	Isfahan, Iran
**Bachelor of Science	Applied Mathematics**	2007
University of Isfahan	Isfahan, Iran

II. WORK EXPERIENCE

Chief Scientist	2020–present
Earth and Space Inc.	Calgary, AB

- Preparing research and development proposals
- Training and supervising data scientists
- Developed novel change detection methods within satellite image time series
- Analyzed a network of astronomical interferometer data
- Analyzed light curves of many cataclysmic variable stars

Postdoctoral Associate	2021–present
Department of Geomatics Engineering, University of Calgary	Calgary, AB

- Conducting research in the area of climate change
- Preparing the grant applications
- Conducting literature review in support of grant applications
- Providing technical help to the graduate students

Research Associate
University of Calgary and Alberta Government and Parks

2019–2020
Calgary, AB

- Proposed a robust Bayesian method for global climate models
- Developed a Python package to compute the 27 climate indices
- Investigated the relationship between discharge and water level in Alberta
- Investigated possible relationships between climate and waterflow
- Proposed an effective time-varying visualization technique
- Trained several graduate students and government employees

Sessional Instructor – Part-Time
Department of Mathematics and Statistics, University of Calgary

2016–2018, 2019–2021
Calgary, AB

- Taught ten undergraduate courses
- Prepared lectures, videos, labs, assignments, and exams
- Supervised teaching assistants and followed their performance

Postdoctoral Scholar
Department of Mathematics and Statistics, University of Calgary

2016–2018
Calgary, AB

- Developed computer code for seismic data processing
- Proposed novel methods of seismic data regularization
- Trained graduate students for seismic data processing

Senior Data Scientist
Farmers Edge Inc.

2016–2019
Lethbridge, AB

- Proposed a robust method for unsupervised management zone delineation
- Proposed robust machine learning techniques for crop disease forecasting
- Developed Python and C++ code for fertilizer calculation
- Implemented a deep learning algorithm for cloud-shadow detection
- Trained several employees spatial optimization methods

Research and Teaching Assistant
Department of Earth and Space Science, York University

2013–2016
Toronto, ON

- Proposed robust methods of analyzing unequally sampled time series
- Developed novel methods of phase and coherency analysis
- Investigated gravity and superconductive gravimeter data for geoid modeling
- Analyzed a network of Global Positioning System (GPS) time series
- Scrutinized interferometric data and telescope observations
- Processed multidimensional marine seismic data
- Developed a sophisticated software package for satellite constellations and navigation
- Conceptualized map projections, such as equal-area, conformal, and conventional
- Assisted students to perform experiments in laboratories
- Taught many engineering, data science, and environmental courses

Research and Teaching Assistant
Department of Mathematics and Computer Science, University of Lethbridge

2010–2013
Lethbridge, AB

- Introduced signed group orthogonal designs
- Improved the asymptotic existence of orthogonal designs and Hadamard matrices
- Conducted research in coding theory, cryptography, and wireless networking
- Proved the Hamiltonicity of Cayley graphs of certain orders
- Applied Cayley graphs to intelligent transportation systems and social media
- Taught many mathematics and computational courses

III. HONORS AND AWARDS

Postdoctoral Scholarship	2021
York University Distinguished Scholar Prize	2019
Postdoctoral Scholarship from Pacific Institute for the Mathematical Sciences (PIMS)	2016–2018
Best Paper Award in Geodesy from the Canadian Geophysical Union	2015
Best Presentation Award from York University	2015
York Graduate Scholarships and Awards from York University	2013–2015
Top Student at York University	2013–2015
Advantage and Admission Awards from the University of Lethbridge	2010–2013
Top Student at the University of Lethbridge	2010–2012
On the Dean's Honor List Every Semester	2003–2010

IV. SKILLS

Languages: English, Farsi (Native), French (Beginner)
Programming: Python, MATLAB, C++, Maple, Java, R, GIS, WeBWork
Document Creation: Latex, Microsoft Office Suite (Excel, Word, PowerPoint)

V. PUBLICATIONS

Category	Total Count
Peer-Reviewed Journal Articles	21
Book Chapters	1
Patents	1
Technical Reports	4
Conference Proceedings	2
Presentations – Abstracts	12
Posters	2
Grand Total	**43**

Peer-Reviewed Journal Articles

Q is the SJR quartile for 2020: Scimago Journal & Country Rank (scimagojr.com)

1. **Ghaderpour, E.**, Vujadinovic, T., and Hassan, Q. K., 2021. Application of the Least-Squares Wavelet Software in Hydrology: Athabasca River Basin, Journal of Hydrology: Regional Studies (Q1), To Appear.

2. **Ghaderpour, E.**, and Hassan, Q. K., 2021. A survey on change detection and time series analysis with applications, Applied Sciences (Q2), To Appear.

3. **Ghaderpour, E.**, 2021. JUST: MATLAB and Python software for change detection and time series analysis, GPS Solutions (Q1), 25:85.

4. **Ghaderpour, E.**, and Vujadinovic, T., 2020. Change detection within remotely-sensed satellite image time series via spectral analysis. Remote Sensing (Q1), 12(23): 4001.

5. **Ghaderpour, E.**, and Vujadinovic, T., 2020. The potential of the least-squares spectral and cross-wavelet analyses for near-real-time disturbance detection within unequally spaced satellite image time series. Remote Sensing (Q1), 12(15): 2446.

6. **Ghaderpour, E.**, 2020. Least-squares wavelet and cross-wavelet analyses of VLBI baseline length and temperature time series: Fortaleza-Hartrao-Westford-Wettzell. Publications of the Astronomical Society of the Pacific (Q1), 133(1019), pp. 10.

7. **Ghaderpour, E.**, and Ghaderpour, S., 2020. Least-squares spectral and wavelet analyses of V455 Andromedae time series: The life after the super-outburst. Publications of the Astronomical Society of the Pacific (Q1), 132(1017), pp. 11.

8. **Ghaderpour, E.**, Ben Abbes, A., Rhif, M., Pagiatakis, S. D., and Farah, I. R., 2020. Non-stationary and unequally spaced NDVI time series analyses by the LSWAVE software. International Journal of Remote Sensing (Q1), 41(6), 2374–2390.

9. **Ghaderpour, E.**, Pagiatakis, S. D., 2019. LSWAVE: a MATLAB software for the least-squares wavelet and cross-wavelet analyses. GPS Solutions (Q1), 23:50.

10. **Ghaderpour, E.**, 2019. Multichannel antileakage least-squares spectral analysis for seismic data regularization beyond aliasing. Acta Geophysica (Q2), 67(5), 1349–1363.

11. **Ghaderpour, E.**, 2018. Constructions for orthogonal designs using signed group orthogonal designs. Discrete Mathematics (Q1), 341(1), 277–285.

12. **Ghaderpour, E.**, Liao, W., Lamoureux, M. P., 2018. Antileakage least-squares spectral analysis for seismic data regularization and random noise attenuation. Geophysics (Q1), 83(3), V157–V170.

13. **Ghaderpour, E.**, Ince, E. S., and Pagiatakis, S. D., 2018. Least-squares cross-wavelet analysis and its applications in geophysical time series. Journal of Geodesy (Q1), 92(10), 1223–1236.

14. **Ghaderpour, E.**, Pagiatakis, S. D., 2017. Least-squares wavelet analysis of unequally spaced and non-stationary time series and its applications. Mathematical Geosciences (Q2), 49(7), 819–844.

15. **Ghaderpour, E.**, 2016. Some equal-area, conformal and conventional map projections: a tutorial review. Journal of Applied Geodesy (Q2), 10(3), 197–209.

16. **Ghaderpour, E.**, 2016. Some non-existence and asymptotic existence results for weighing matrices. International Journal of Combinatorics, pp. 6.

17. **Ghaderpour, E.**, 2015. Some constructions for amicable orthogonal designs. Australasian Journal of Combinatorics (Q3), 63(3), 374–384.

18. **Ghaderpour, E.**, and Kharaghani, H., 2014. The asymptotic existence of orthogonal designs. Australasian Journal of Combinatorics (Q3), 58(2), 333–346.

19. **Ghaderpour, E.**, and Morris, D. W., 2014. Cayley graphs on nilpotent groups with cyclic commutator subgroup are Hamiltonian. Ars Mathematica Contemporanea (Q2), 7(1), 55–72.

20. **Ghaderpour, E.**, and Morris, D. W., 2012. Cayley graphs of order 30p are Hamiltonian. Discrete Mathematics (Q1) , 312(24), 3614-3625.

21. **Ghaderpour, E.**, and Morris, D. W., 2011. Cayley graphs of order 27p are Hamiltonian. International Journal of Combinatorics, pp. 16.

BOOK CHAPTERS: PEER-REVIEWED

1. **Ghaderpour, E.**, 2015. Signed group orthogonal designs and their applications. In Algebraic Design Theory and Hadamard Matrices. *Springer Proceedings in Math and Stat*, 133, 107–123.

PATENTS

1. **Ghaderpour, E.**, Jensen M., Duke G., McCaffrey D.R., 2019. Refined Average for Zoning Method and System, US Patent App. 16/847, 184.

Technical Reports

1. **Ghaderpour, E.**, Jensen M., McCaffrey D.R., 2019. Delineation of unsupervised management zones. Farmers Edge Inc.

2. **Ghaderpour, E.**, Dorland, J., Kapoko, F., 2015. Multi-navigation satellite system constellation simulator. York University.

3. **Ghaderpour, E.**, 2014. Map projections. York University.

4. **Ghaderpour, E.**, 2011. Polynomial factorization over real numbers. University of Lethbridge.

Conference Proceedings

1. **Ghaderpour, E.**, Liao, W., and Lamoureux, M. P., May 2017. Anti-leakage least-squares spectral analysis for data regularization, Geo Convention, Calgary, Canada.

2. **Ghaderpour, E.**, and Pagiatakis S. D., May 2015. Least-squares wavelet analysis, Canadian Geophysical Union, Montreal, Canada.

Presentations

1. **Ghaderpour, E.**, April 2021. Least-squares spectral and wavelet analyses and their applications in geodesy and geophysics, Colloquium Series 2020-2021, Department of Mathematics and Statistics, University of Calgary, Canada.

2. **Ghaderpour, E.**, March 2020. Chapter 9: Convolutional Network, Review of "Deep Learning" book by I. Goodfellow, Y. Benjio, and A. Courville, Lunch at the Lab Mathematical Finance Seminar Series, Department of Mathematics and Statistics, University of Calgary, Canada.

3. **Ghaderpour, E.**, Ben Abbes, A., Rhif, M., Pagiatakis, S. D., and Farah, I. R., July 2019. Non-stationary and unequally spaced NDVI time series analyses by the LSWAVE software, International Union of Geodesy and Geophysics, Montreal, Canada.

4. **Ghaderpour, E.**, July 2019. Time-varying Visualization with a Single Image Summary, Department of Computer Science, University of Calgary, Canada

5. **Ghaderpour, E.**, February 2019. Geoid and its applications, Department of Computer Science, University of Calgary, Canada.

6. **Ghaderpour, E.**, March 2018. Multichannel antileakage least-squares spectral analysis for seismic data regularization beyond aliasing, Diversification Trends in Engineering Technology and Applied sciences (DTETA), Tokyo, Japan.

7. **Ghaderpour, E.**, Liao, W., and Lamoureux, M. P., March 2017. Antileakage least-squares spectral analysis for data regularization, Consortium for Research in Elastic Wave Exploration Seismology (CREWES), University of Calgary, Canada.

8. **Ghaderpour, E.**, and Pagiatakis S. D., October 2016. Least-squares wavelet analysis and its applications. The 38th Annual Meeting of Alberta Statisticians, University of Alberta, Canada.

9. Abd El-Gelil, M., **Ghaderpour, E.**, and Pagiatakis S. D., June 2016. The potential of the least-squares wavelet analysis for estimating the time-frequency transfer function of atmospheric variations effect of superconducting gravity data, the 18th international symposium on the Geodynamics and Earth Tide, Trieste, Italy.

10. **Ghaderpour, E.**, July 2014. Signed group orthogonal designs and their applications. Workshop on Algebraic Design Theory and Hadamard Matrices, University of Lethbridge, Canada.

11. **Ghaderpour, E.**, 2013. The asymptotic existence of orthogonal design. Number Theory and Combinatorics, University of Lethbridge, Canada.

12. **Ghaderpour, E.**, 2012. Bounds for systems of lines, University of Lethbridge, Canada.

Posters

1. **Ghaderpour, E.**, Ince, E. S., and Pagiatakis, S. D., March 2018. Least-squares wavelet analysis and its applications in geodetic and geophysical time series analyses, European Geosciences Union General Assembly, Vienna, Austria.

2. **Ghaderpour, E.**, and Pagiatakis S. D., June 2015. Least-squares wavelet analysis and its applications, International Union of Geodesy and Geophysics, Prague, Czech Republic.

VI. SOFTWARE DEVELOPMENT

🔗 **JUST**: Jumps Upon Spectrum and Trend in Python and MATLAB — 2021
National Oceanic and Atmospheric Administration (NOAA) — Washington, DC, US

🔗 Climate Index Calculator in Python and MATLAB — 2020
Alberta Environment and Park — Calgary, AB, Canada

🔗 **LSWAVE**: Least-Squares WAVElet in MATLAB — 2019
National Oceanic and Atmospheric Administration (NOAA) — Washington, DC, US

🔗 Management Zone Builder and Cloud-Shadow Detector in Python — 2017
Farmers Edge Inc. — Winnipeg, MB, Canada

🔗 Fertilizer Calculator in Python — 2016
Farmers Edge Inc. — Winnipeg, MB, Canada

Multi-Navigation Satellite System Constellation Simulator in MATLAB — 2015
York University — Toronto, ON, Canada

Orthogonal Design Generator in C++ and Python — 2013
University of Lethbridge — Lethbridge, AB, Canada

VII. TEACHING EXPERIENCE

Sessional Appointments: **13** Undergraduate Courses

Mathematical Methods (MATH 415) — Winter 2021
Department of Mathematics and Statistics — University of Calgary
- Signal Processing: Prepared lectures, videos, Top Hat assignments, lab questions, and final exam | 60 students

Linear Methods I (MATH 211) — Winter 2021
Department of Mathematics and Statistics — University of Calgary
- Supervised five teaching assistants and distributed tasks among them, monitored the student activities in the D2L discussion board | 620 students

Calculus II (MATH 2560A) — Winter 2021
Department of Mathematics and Computer Science — University of Lethbridge
- Prepared lectures, videos, WeBWork assignments, CrowdMark weekly quizzes, and final exam | 100 students

Differential Equations (MATH 375 and AMAT 311) — Falls 2017, 2020
Department of Mathematics and Statistics — University of Calgary
- Prepared lectures, videos, assignments, and exams | 200+ students

Multivariable Calculus for Eng. and Sci. (MATH 277) — Winters 2017, 2020
Department of Mathematics and Statistics — University of Calgary
- Prepared lectures and helped with setting up the exams | 300+ students

University Calculus III (MATH 367)
Fall 2019

Department of Mathematics and Statistics — University of Calgary

- Prepared lectures, lab questions, WeBWork assignments, and exams, including grading and invigilation | 116 students

Calculus I (MATH 249 and MATH 265 and MATH 275)
Falls 2016, 2017, 2019

Department of Mathematics and Statistics — University of Calgary

- Prepared lectures and helped with setting up the exams | 600+ students

Differential Equations
Winter 2010

Department of Mathematics — Azad University of Najaf Abad, Isfahan, Iran

- Prepared lectures and exams | 90 students

Calculus
Winter 2010

Department of Mathematics — Azad University of Tiran, Isfahan, Iran

- Prepared lectures and exams | 50 students

GUEST LECTURES: 2 GRADUATE COURSES

Computational Finance (MATH 683)
Winter 2017

Department of Mathematics and Statistics — University of Calgary

- Prepared and taught one lecture

Scientific Computation (MATH 661)
Fall 2016

Department of Mathematics and Statistics — University of Calgary

- Prepared and taught one lecture

TEACHING ASSISTANT APPOINTMENTS

Electricity, Magnetism, and Optics for Engineers (PHYS 1801)
Winter 2016

Department of Earth and Space Science and Engineering — York University

- Set up exams and laboratory instruments

Earth Environment (ESSE 1012 & SC/EATS 1010)
Falls 2013, 2014, Winter 2016

Department of Earth and Space Science and Engineering — York University

- Organized lab sessions and graded exams and assignments
- Grouped students for GPS surveying

Adjustment Calculus (LE/ESSE 3620 & LE/ESSE 3630)
Fall 2014, Winter 2015

Department of Earth and Space Science and Engineering — York University

- Organized lab sessions and helped students with their assignments
- Prepared quizzes for students and graded quizzes and assignments

Continuum Mechanics (LE/EATS 2470)
Winter 2014

Department of Earth and Atmospheric Science — York University

- Helped students with their assignments and graded them
- Conducted labs for the instrumental experience

The History of Astronomy (SC/NATS 1745)
Summer 2014

Department of Natural Science — York University

- Graded online assignments and projects

VIII. SERVICES

Journal Reviewer

Verified Reviews Available at 🔗 Publons and 🔗 ORCID

Publisher	Journal	Total Reviews
	Applied Sciences	6
	Remote Sensing	5
	Energies	4
Multidisciplinary Digital	Data	2
Publishing Institute (MDPI)	ISPRS International Journal of Geo-Information	2
	Sensors	2
	Sustainability	2
	Mathematics	1
DMFA Slovenia	Ars Mathematica Contemporanea	1
	The Art of Discrete and Applied Mathematics	1
Society of Exploration Geophysicists	Geophysics	7
World Scientific	Discrete Mathematics, Algorithms, and Applications	3
Taylor and Francis	Canadian Journal of Remote Sensing	2
IEEE Signal Processing Society	IEEE Transaction on Signal Processing	2
IEEE Sensors Council	IEEE Sensors Journal	1
Springer Nature	Journal of Algebraic Combinatorics	1
De Gruyter	Special Matrices	1
	Grant Total	**43**

Academic Supervisions

- Training and supervising H. Dastour on how to use and analyze satellite data
- Jointly involved in advising B. Brunson, M. Gill, A. Peidou, E. S. Ince, and D. Li

Memberships

- Canadian Geophysical Union (CGU)
- International Union of Geodesy and Geophysics (IUGG)
- Calgary Tesla Society 🔗, a non-profit organization

Library, Elementary School and High School Presentations

- As a board member of the Calgary Tesla Society, I have given many scientific presentations about Nikola Tesla and demonstrated some of his inventions, such as the levitating light bulb, plasma globe, egg of Columbus, and wind turbine in many libraries and schools in Calgary since 2016

Other Volunteering Activities

- Participated on hiring committees at universities and Farmers Edge Inc.
- Provided consultations to scientists regarding the Earth and environmental related projects
- Scored the Canadian Open Mathematics Competitions
- Participated in the Graduate Student Information
- Helped in organizing several workshops at the University of Lethbridge and York University