

# Michael R. Lindstrom

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## Academic Positions

- Assistant Professor, School of Mathematics and Statistical Sciences, The University of Texas Rio Grande Valley (2022–present)
- Assistant Adjunct Professor (Program in Computing), Department of Mathematics, University of California Los Angeles (2015–2022).

## Education

- B.Sc. Physics and Mathematics (Hons.), University of British Columbia.
- M.Sc. Mathematics, University of British Columbia.
- PhD. Mathematics, University of British Columbia.

## Research Areas

- mathematical modelling, partial differential equations, data science, formal asymptotics, scientific computing

## Publications

### Journal Papers

#### Accepted/Published

1. Keyi Cheng, Stefan Inzer, Adrian Leung, Xiaoxian Shen, Michael Perlmutter, Michael R Lindstrom, Joyce Chew, Todd Presner, and Deanna Needell. Multi-scale hybridized topic modeling: A pipeline for analyzing unstructured text datasets via topic modeling. *SIAM Undergraduate Research Online*, 2023
2. Michael R Lindstrom, Xiaofu Ding, Feng Liu, Anand Somayajula, and Deanna Needell. Continuous semi-supervised nonnegative matrix factorization. *Algorithms*, 16(4):187, 2023
3. Marcelo Bongarti, Luke Diego Galvan, Lawford Hatcher, Michael R Lindstrom, Christian Parkinson, Chuntian Wang, and Andrea L Bertozzi. Alternative siar models for infectious diseases and applications in the study of non-compliance. *Mathematical Models and Methods in Applied Sciences*, pages 1–29, 2022

4. Thomas E Valles, Hannah Shoenhard, Joseph Zinski, Sarah Trick, Mason A Porter, and Michael R Lindstrom. Networks of necessity: Simulating covid-19 mitigation strategies for disabled people and their caregivers. *PLOS Computational Biology*, 18(5):e1010042, 2022
5. Kaiyan Peng, Zheng Lu, Vanessa Lin, Michael R Lindstrom, Christian Parkinson, Chuntian Wang, Andrea L Bertozzi, and Mason A Porter. A multilayer network model of the coevolution of the spread of a disease and competing opinions. *Mathematical Models and Methods in Applied Sciences*, 31(12):2455–2494, 2021
6. Michael R Lindstrom, Manuel B Chavez, Elijah A Gross-Sable, Eric Y Hayden, and David B Teplow. From reaction kinetics to dementia: A simple dimer model of alzheimer’s disease etiology. *PLoS computational biology*, 17(7):e1009114, 2021
7. Michael R Lindstrom, Hyuntae Jung, and Denis Larocque. Functional kernel density estimation: Point and fourier approaches to time series anomaly detection. *Entropy*, 22(12):1363, 2020
8. Michael R Lindstrom and Andrea L Bertozzi. Qualitative features of a nonlinear, nonlocal, agent-based pde model with applications to homelessness. *Mathematical Models and Methods in Applied Sciences*, 30(10):1863–1891, 2020
9. Dominic Diaz, Jessica Bojorquez, Joshua Crasto, Margaret Koulikova, Tameez Latib, Aviva Prins, Andrew Shapiro, Clover Ye, David Arnold, Claudia Falcon, Michael R. Lindstrom, and L. Bertozzi, Andrea. Investigation of constant volume and constant flux initial conditions on bidensity particle-laden slurries on an incline. *American Journal of Undergraduate Research*, 16(3):42–57, 2019
10. Jeffrey Wong, Michael Lindstrom, and Andrea L Bertozzi. Fast equilibration dynamics of viscous particle-laden flow in an inclined channel. *Journal of Fluid Mechanics*, 879:28–53, 2019
11. Saad Dara, Michael Lindstrom, Joseph English, Arman Bonakdarpour, Brian Wetton, and David P Wilkinson. Conversion of saline water and dissolved carbon dioxide into value-added chemicals by electro dialysis. *Journal of CO2 Utilization*, 19:177–184, 2017
12. Michael Lindstrom. Assessment of the effects of azimuthal mode number perturbations upon the implosion processes of fluids in cylinders. *Physica D: Nonlinear Phenomena*, 349:77–90, 2017
13. Michael Lindstrom, Alex C Y Fang, and Robert F Kiefl. Effect of surface roughness on the magnetic field profile in the meissner state of a superconductor. *Journal of Superconductivity and Novel Magnetism*, 29(6):1499–1507, 2016
14. Michael Lindstrom, Iain Moyles, and Kevin Ryczko. Electric ion dispersion as a new type of mass spectrometer. *Mathematics-in-Industry Case Studies*, 7(1):1–13, 2017
15. Michael Lindstrom. Asymptotic analysis of a magnetized target fusion reactor. *SIAM Journal on Applied Mathematics*, 75(5):2050–2071, 2015
16. Carmen Bruni, Christina Koch, Bernhard Konrad, Michael Lindstrom, Iain Moyles, and Will Thompson. From exam to education: The math exam/education resources. *PRIMUS*, 26(7):631–656, 2016
17. Michael Lindstrom, Sandra Barsky, and Brian Wetton. Investigation into fusion feasibility of a magnetized target fusion reactor: A preliminary numerical framework. *Journal of Fusion Energy*, 34(1):76–83, 2015

18. Michael Lindstrom and Brian Wetton. A comparison of fick and maxwell–stefan diffusion formulations in pemfc gas diffusion layers. *Heat and Mass Transfer*, 53(1):205–212, 2017
19. Bernhard P Konrad, Michael Lindstrom, Anja Gumpinger, Jielin Zhu, and Daniel Coombs. Assessing the optimal virulence of malaria-targeting mosquito pathogens: a mathematical study of engineered metarhizium anisopliae. *Malaria journal*, 13(1):1–10, 2014
20. Michael Lindstrom, Brian Wetton, and Rob Kiefl. Mathematical modelling of the effect of surface roughness on magnetic field profiles in type ii superconductors. *Journal of Engineering Mathematics*, 85(1):149–177, 2014

### Peer-Reviewed Conference Papers

21. Michael R Lindstrom, William J Swartworth, and Deanna Needell. Reconstructing piezoelectric responses over a lattice: Adaptive sampling of low dimensional time series representations based on relative isolation and gradient size. In *Smoky Mountains Computational Sciences and Engineering Conference*, pages 420–429. Springer, 2021
22. Michael Lindstrom, Brian Wetton, and Rob Kiefl. Modelling the effects of surface roughness on superconductors. *Physics Procedia*, 30:249–253, 2012

### Industrial Workshop Reports

23. Javier Almonacid, Sean Bohun, Douglas Bowen Bowen, Thomas Gkelsinis, Slim Ibrahim, Michael R Lindstrom, Joy Liu, and Kyle Onghai Onghai. Turbulence in the Air, 2022
24. P. Gawas, H Jung, D Larocque, M R Lindstrom, G Poirier, and S Ahmed. Predictive risk modelling in aviation incidents. *Comptes rendus du Dixième atelier de résolution de problèmes industriels de Montréal, 13–27 août 2020*, 2021
25. D Boursicot, M. Comeau, P Gagnon, C Gauvin, R Han, B Ferland-Raymond, M Lindstrom, N Razaaly, J Schulz, J. Shen, T. Wong, and R. Eghbalzadeh. Poisson regression for smooth geographic stratification of risk. *Comptes rendus du Neuvième atelier de résolution de problèmes industriels de Montréal, 19–23 août 2019*, 2020

### Whitepapers

26. MR Lindstrom, MA Porter, H Shoenhard, S Trick, TE Valles, and JM Zinski. Networks of necessity: Preventing covid-19 among disabled people and their caregivers., 2020

### Theses

27. Michael Lindstrom. Investigation into the feasibility and operation of a magnetized target fusion reactor, 2015 (PhD)
28. Michael Lindstrom. Asymptotic and numerical modeling of magnetic field profiles in superconductors with rough boundaries and multi-component gas transport in PEM fuel cells, 2010 (MSc)
29. Michael Lindstrom. Computation of Gluon Scattering Amplitudes in N=4 SYM Gauge Theory via AdS-CFT Duality, 2008 (BSc)

## Selected Talks, Conferences, and Workshops

- Coastal Bend Conference, Brownsville, TX, 2023 (talk)
- University of Texas Rio Grande Valley, Edinburg, TX, 2023, Research and Advisement Seminar (invited talk)
- Alamo Symposium in Statistics, San Antonio, TX, 2023 (talk)
- University of Arizona, Early Career Seminar, 2023 (invited virtual talk)
- University of Texas Rio Grande Valley, Edinburg, TX, 2022, Graduate Research Seminar (talk)
- University of Texas Rio Grande Valley, Edinburg, TX, 2022, Research and Advisement Seminar (invited talk)
- CRM Industrial Problem Solving Workshop, Montreal, Canada, 2022 (mentor: IATA air turbulence problem)
- Cal State University, Long Beach, 2022 (invited talk)
- UC Irvine Math Seminar, online, 2022 (invited talk)
- The University of Texas Rio Grande Valley Computational Applied Math Colloquium, online, 2022 (invited talk)
- Portland State University Applied Math Colloquium, 2022 (invited talk)
- University of Texas at San Antonio Applied Math Seminar, online, 2021 (invited talk)
- Texas Tech University Math Colloquium, online, 2021 (invited talk)
- BIRS Workshop: New Trends in Nonlinear Diffusion: a Bridge between PDEs, Analysis and Geometry, online, 2021 (attendee)
- CRM Industrial Problem Solving Workshop, online, 2021 (mentor)
- CAIMS 2021, virtual conference (invited talk).
- Oakland University Applied Math Colloquium, virtual presentation, 2021 (invited talk).
- UC Riverside PDE and Applied Math Seminar, virtual presentation, 2020 (invited talk).
- CRM Industrial Problem Solving Workshop, online, 2020 (participant: IATA anomaly detection problem).
- Portland State University Applied Math Colloquium, virtual presentation, 2020 (invited talk).
- UC Merced Applied Colloquium, Merced, California, USA, 2020 (invited talk).
- UCLA Applied Math Colloquium, Los Angeles, USA, 2019 (talk).
- CRM Industrial Problem Solving Workshop, Montreal, Canada, 2019 (participant: insurance risk stratification problem).
- Mount Allison University Math Colloquium, Sackville, New Brunswick, Canada, 2017 (invited talk).
- UCLA Undergraduate Math Students Association Professor Talk, Los Angeles, USA, 2017 (invited talk).
- UBC Math Department Colloquium, Vancouver, Canada, 2014 (invited talk).
- Fields-MPrime Industrial Problem Solving Workshop, Toronto, Canada, 2014 (participant: mass spectrometry problem).

- Simon Fraser University Applied Math Colloquium, Burnaby, Canada, 2013 (invited talk).
- CRM Industrial Problem Solving Workshop, Montreal, Canada, 2013 (participant: Brittle Bone Disease problem).
- $\mu$ SR2011, Cancun, Mexico, 2011 (poster).

## Mentoring Experience

- Mentor for CRM Industrial Problem Solving Workshop, Montreal, 2022.
- Supervising graduates and undergraduates in building PDE models and running experiments for bidisperse viscous suspension flows, 2022.
- Supervising undergraduates in using data science to understand Holocaust testimonies, 2022.
- Mentor for CRM Industrial Problem Solving Workshop, online, 2021.
- Supervising undergraduates on sampling methods for the homeless population, 2021.
- Supervising undergraduates on models of prion diseases, 2021.
- Supervising graduates and undergraduates on multiple models for COVID-19, 2020.
- Supervising undergraduate research on a network model of COVID-19, 2020.
- Supervising undergraduates and graduates in studying homicide data, 2019.
- Supervising undergraduates in modelling Alzheimer's Disease, 2019.
- Supervising undergraduates and graduates in analyzing and finding patterns within Twitter data from Los Angeles, 2018.
- Supervising undergraduates in studying the effectiveness of a gang reduction intervention program, 2018.
- Supervising undergraduates in modelling homeless movement patterns, 2017-2018.
- Supervising undergraduates in modelling homeless crime, 2017.
- Supervising undergraduates in fluid dynamics modelling and experimentation for bidensity slurries, 2017.
- Supervising undergraduates and graduates in fluid dynamics modelling and experimentation for monodisperse slurries, 2016.
- Supervising undergraduate research on superconductivity, 2014.

## Referee Experience By Topic

- Accessible Healthcare
- Scientific Computing
- Mathematical Modelling
- Mechanical Engineering

## Selected Honours, Awards, and Fellowships

- Smoky Mountains Computational Sciences and Engineering Conference Best Solution Runner Up (Advanced Category), 2021.
- NSERC Postdoctoral Fellowship, 2017-2019.
- AARMS Postdoctoral Fellowship, 2015 (declined offer).
- UBC Math Department Graduate Research Award in Applied Mathematics, 2014.
- Westcoast Energy Inc. Jack Davis Scholarship in Energy Studies, 2012-2013.
- MITACS Industrial Scholarship, 2010.
- NSERC PGS-M Scholarship, 2008–2010.

## Selected Department Service and Academic Roles

- Undergraduate Studies committee member UCLA, 2020–2021
- Math Learning Centre committee member, 2014–2015.
- Review session facilitator for Math 100&180 (differential calculus - physics and engineering), UBC, 2013.
- Review session facilitator for Math 104 (differential calculus - commerce and social sciences), UBC, 2013.
- WebWorK (online open source homeworks) Problem Creator/Developer, Math and Stats Department, UBC, 2013.
- Review session facilitator for Math 105 (integral calculus - commerce and social sciences), UBC, 2013.

## Teaching Development and Accomplishments

- Developed curricula for UCLA courses, 2016-2022.
- TA Accreditation Program, 2012.
- ISW Facilitator Development Workshop (FDW), 2012.
- Instructional Skills Workshop (ISW), 2011.

## Courses Taught

- Math 3343, Intro to Math Software, UTRGV, 2022 (one semester)
- Math 32A, Multivariable Calculus, UCLA, 2022 (one quarter)
- Math 199, Directed Research, UCLA, 2017-2022 (ten quarters)
- PIC 10C, Advanced Programming (C++), UCLA, 2020-2022 (four quarters)
- PIC 10B, Intermediate Programming (C++), UCLA, 2016-2021 (nine quarters)
- Math 142, Mathematical Modelling, UCLA, 2016-2017 (four quarters)
- PIC 40A, Introduction to Web Programming, UCLA, 2016, 2018-2019 (six quarters)

- PIC 10A, Introduction to Computing (C++), UCLA, 2015-2016 (seven quarters)
- Math 448, Directed Studies in Mathematics, UBC, 2014 (one term)
- Math 215, Elementary Differential Equations, UBC, 2014 (one term)
- Math 104, Differential Calculus with Applications to Commerce and Social Sciences, UBC, 2012 (one term)
- Math 105, Integral Calculus with Applications to Commerce and Social Sciences, UBC, 2012, 2015 (two terms)
- Math 103, Integral Calculus with Applications to Life Sciences, UBC, 2011 (one term)
- Math 101, Integral Calculus with Applications to Physical Sciences and Engineering, UBC, 2010 (one term)

## Miscellaneous Skills, Credentials, and Activities

- Programming: C++, Python, Matlab, HTML/CSS, JavaScript, PHP, SQLite, C.
- Human Subjects Protection Certification Training (CITI)
- Languages: English (native), French (proficient), Spanish (elementary).