Michael Lindstrom

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Current Position

Assistant Adjunct Professor (Program in Computing), Mathematics Department, University of California at Los Angeles (2015–present).

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

partial differential equations, machine learning, formal asymptotics, scientific computing, industrial modelling

Research

Journal Articles

In Preparation

1. "Applications of Semi-Supervised NMF"
2. "Local Existence of Solutions to a Nonlinear PDE Model for Population Dynamics with Migration and Competition"

Preprints/Submitted/Under Revision

3. Valles, T.E., Shoenhard, H., Zinski, J., Trick, S., Porter, M.A., and Lindstrom, M.R. "Networks of Necessity: Simulating Strategies for COVID-19 Mitigation among Disabled People and Their Caregivers"
4. Lindstrom, M. R., Chavez, M. B., Gross-Sable E. A., Hayden, E. Y., and Teplow, D. B. "From reaction kinetics to dementia: a simple dimer model of Alzheimer's disease etiology"
5. Lindstrom, M.R., Du, R., Ng, X.Y., Diaz, D., Nero, M., Koulikova, M., Ross, H., Shukla, S., Bertozzi, A.L., and Brantingham, P. J. "Using Local Geographic Features to Predict Changes in the Los Angeles Homeless Population"

Accepted/Published Journal Articles

6. Lindstrom, M.R., Jung, H., and Larocque, D.,"Functional Kernel Density Estimation: Point and Fourier Approaches to Time Series Anomaly Detection" (2020, accepted to Entropy)

7. Lindstrom, M. R., and Bertozzi, A.L., "A Continuum PDE Model for Agents on a Lattice with Applications to Homelessness" (2020, M3AS special issue on Swarms, Crowds, and Social Systems)

8. Diaz, D., Bojorquez, J., Crasto, J., Koulikova, M., Latib, T., Prins, A., Shapiro, A., Ye, C., Arnold, D., Falcon, C., Lindstrom, M. R., and Bertozzi, A.L. "Investigation of Constant Volume and Constant Flux Initial Conditions on Bidensity Particle-Laden Slurries on an Incline" (2019, published in American Journal of Undergraduate Research)

9. Wong, J., Lindstrom, M. and Bertozzi, A. "Fast equilibration dynamics of viscous particle-laden flow" (2019, published in Journal of Fluid Mechanics)

10. Dara, S., Lindstrom, M., English, J., Bonakdarpour, A., Wetton, B., and Wilkinson, D. "Conversion of Waste Water and Carbon Dioxide into Value-Added Chemicals by Electrodialysis" (2017, published in Journal of CO2 Utilization)

11. Lindstrom, M. "Assessment of the Effects of Azimuthal Mode Number Perturbations upon the Implosion Processes of Fluids in Cylinders" (2017, published in Physica D)

12. Lindstrom, M., Fang C.Y., and Kiefl, R. "Effect of Surface Roughness on the Magnetic Field Profile in the Meissner State of a Superconductor" (2016, published in Journal of Superconductivity and Novel Magnetism)

13. Lindstrom, M., Moyles, I., and Ryczko, K. "Electric Ion Dispersion as a New Type of Mass Spectrometer" (2015, published in Mathematics-in-Industry: Case Studies)

14. Lindstrom, M. "Asymptotic Estimation for Minimal Plasma Radius in a Spherically Symmetric Magnetized Target Fusion Reactor Model" (2015, published in SIAM Journal on Applied Mathematics)

15. Bruni, C., Koch, C., Konrad, B., Lindstrom, M., Moyles, I., and Thompson, W. "From Exam to Education: The Math Exam/Educational Resources wiki" (2015, published in PRIMUS)

16. Lindstrom, M., Barsky, S., and Wetton, B. "Investigation into Fusion Feasibility of a Magnetized Target Fusion Reactor: A Preliminary Numerical Framework" (2014, published in Journal of Fusion Energy)

17. Lindstrom, M. and Wetton, B. "A Comparison of Fick and Maxwell-Stefan Diffusion Formulations in PEMFC Cathode Gas Diffusion Layers" (2016, published in Heat and Mass Transfer)

18. Konrad, B., Lindstrom, M., Gumpinger, A., Zhu, J., and Coombs, D. "Assessing the optimal virulence of malaria-targeting mosquito pathogens: a mathematical study of engineered Metarhizium anisopliae" (2013, published in Malaria Journal)

19. Lindstrom, M., Wetton, B., and Kiefl R. "Mathematical Modelling of the Effect of Surface Roughness on Magnetic Field Profiles in Superconductors" (2013, published in Journal of Engineering Mathematics)

Proceedings and Technical Reports

20. Lindstrom, M.R., Porter, M.A., Sheonhard, H., Trick, S., Valles, T., and Zinski, J.M. "Networks of Necessity: Preventing COVID-19 Among Disabled People and Their Caregivers" (2020 policy paper advocating use of PPE and contact limiting for COVID-19 in disabled and caregiver communities)

21. Boursicot, D., Comeau, M., Gagnon, P., Gauvin, C., Han, R., Ferland-Raymond, B., Lindstrom, M., Razaaly, N., Schulz, J., Shen, J., Wong, T., and Eghbalzadeh, R. "Poisson Regression for Smooth Geographic Stratification of Risk" (2019, proceedings from 9th Industrial Problem Solving Workshop in Montréal)

22. Lindstrom, M., Wetton, B., and Kiefl, R. "Modelling the Effects of Surface Roughness on Superconductors" (2012, published in Physics Proceedings for μSR 2011)

Theses

23. PhD Thesis, " Investigation into the Feasibility and Operation of a Magnetized Target Fusion Reactor : Insights from Mathematical Modelling" (2015)
24. Master's Thesis, "Asymptotic and Numerical Modeling of Magnetic Field Profiles in Superconductors with Rough Boundaries and Multi-Component Gas Transport in PEM Fuel Cells" (2010)
25. Honour's Thesis, "Computation of Gluon Scattering Amplitudes in N=4 SYM Gauge Theory via AdS-CFT Duality" (2008)

Selected Talks, Conferences, and Workshops

UC Riverside PDE and Applied Math Seminar, virtual presentation, 2020 (talk).

CRM Industrial Problem Solving Workshop, online, 2020 (particpated: solving IATA anomaly problem).

Portland State University Applied Math Colloquium, virtual presentation, 2020 (talk).

UC Merced Applied Colloquium, Merced, California, USA, 2020 (talk).

NSF ATD+AMPS Workshop, Washington, DC, USA, 2019 (poster).

UCLA Applied Math Colloquium, Los Angeles, USA, 2019 (talk).

CRM Industrial Problem Solving Workshop, Montreal, Canada, 2019 (particpated: solving insurance risk stratification problem).

CAIMS 2019, Whistler, Canada, 2019 (2 talks).

Mount Allison University Math Colloquium, Sackville, New Brunswick, Canada, 2017 (talk).

UCLA Undergraduate Math Students Association Professor Talk, Los Angeles, USA, 2017 (invited talk).

CAIMS 2017, Halifax, Canada, 2017 (talk).

SoCal Fluids 2017, San Diego, USA, 2017 (talk).

SIAM, Boston, USA, 2016 (invited talk).

CAIMS, Edmonton, Canada, 2016 (talk).

UCLA Applied Math Colloquium, Los Angeles, USA, 2016 (talk).

UBC Math Department Colloquium, Vancouver, Canada, 2014 (talk).

UBC Undergraduate Mathematics Colloquium, Vancouver, Canada, 2014 (talk).

Fields-MPrime Industrial Problem Solving Workshop, Toronto, Canada, 2014 (particpated: solving mass spectrometry problem).

UBC Graduate Mathematics Colloquium, Vancouver, Canada, 2013 (talk).

Simon Fraser University Applied Math Colloquium, Burnaby, Canada, 2013 (invited talk).

CRM Industrial Problem Solving Workshop, Montreal, Canada, 2013 (particpated: solving Brittle Bone Disease problem).

Institute for Applied Mathematics Retreat, Vancouver, Canada, 2013 (talk).

CAIMS, Toronto, Canada, 2012 (talk).

UBC Undergraduate Mathematics Colloquium, Vancouver, Canada, 2012 (talk).

AMMCS, Waterloo, Canada, 2011 (talk).

ICIAM, Vancouver, Canada, 2011 (poster).

μSR2011, Cancun, Mexico, 2011 (poster).

PIMS YRC, Vancouver, Canada, 2011 (talk).

Institute for Applied Mathematics Retreat, Vancouver, Canada, 2011 (talk).

Institute for Applied Mathematics Retreat, Vancouver, Canada, 2010 (talk).

TRIUMF Summer Student Presentations, Vancouver, Canada, 2008 (talk).

Pacific Undergraduate Physics and Astronomy Conference, Vancouver, Canada 2008 (talk).

Mentoring Experience

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.

Research Positions

MITACS Internship with Automotive Fuel Cell Cooperation, 2009.

TRIUMF Summer Research, 2009.

NSERC USRA Physics Summer Student, 2008.

NSERC USRA Math Summer Student, 2007.

Referee Experience

Applied Mathematical Modeling, reviewer.

Applied Mathematics and Computation, reviewer.

Transactions of Mechanical Engineering, reviewer.

Selected Honours, Awards, and Fellowships

NSERC Postdoctoral Fellowship, 2017.

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.

Graduate Entrance Scholarship, 2008.

NSERC USRA Summer Student Award, 2007.

Dean's Honour List, University of British Columbia, 2004–2007.

NSERC USRA Summer Student Award, 2006.

Charles and Jane Banks Scholarship, 2006.

Trek Excellence Scholarship, 2005.

Undergraduate Scholar Program Scholarship, 2004.

Academic Experience

Department Service and Academic Roles

Undergraduate Studies committee member, 2020

Supervising teaching assistants, 2015–present

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.

Tutor (tutorial centre), UBC, 2013.

Workshop facilitator for Math 180&184, calculus students without high school calculus, UBC, 2011.

Grader for Math 400 (applied partial differential equations), UBC, 2010.

TA for Math 104 (differential calculus - commerce and social sciences), UBC, 2010.

Math and Physics tutor, Alma Mater Society of UBC, 2007–2010.

Grader and review session facilitator for Math 152 (linear algebra), UBC, 2009.

Teaching Development and Accomplishments

Letter from Dean of Science for high teaching performance at UBC, 2013.

TA Accreditation Program, 2012.

ISW Facilitator Development Workshop, 2012.

Instructional Skills Workshop (ISW), 2011.

Courses Taught

Directed Research, UCLA, 2017-2020 (seven quarters)

Advanced Programming (C++), UCLA, 2020 (one quarter)

Intermediate Programming (C++), UCLA, 2016-2020 (eight quarters)

Mathematical Modelling, UCLA, 2016-2017 (four quarters)

Introduction to Web Programming, UCLA, 2016, 2018-2019 (six quarters)

Introduction to Computing (C++), UCLA, 2015-2016 (six quarters)

Integral Calculus with Applications to Commerce and Social Sciences, UBC, 2015 (one term)

Directed Studies in Mathematics, UBC, 2014 (one term)

Elementary Differential Equations, UBC, 2014 (one term)

Differential Calculus with Applications to Commerce and Social Sciences, UBC, 2012 (one term)

Integral Calculus with Applications to Commerce and Social Sciences, UBC, 2012 (one term)

Integral Calculus with Applications to Life Sciences, UBC, 2011 (one term)

Integral Calculus with Applications to Physical Sciences and Engineering, UBC, 2010 (one term)

Miscellaneous Skills, Credentials, and Activities

Training and Experience

Programming language and markup languages: C++, Python, Matlab, HTML/CSS, JavaScript, PHP, SQLite, C.

Human Subjects Protection Certification Training

Lab Safety Training and Laser Safety Training

Languages: English and basic French.

Software Written

Feedforward Neural Network (C++)

Nelder-Mead Optimization (C++)

Online Teaching/Class Participation Software (JavaScript/PHP)

Volunteer Activities

Instructor/coordinator/volunteer for meditation / personal growth groups, 2005–present.

Math Education Resources wiki contributor, 2012–2015.

Teaching peer reviewer, 2012–2015.

Institute for Applied Mathematics Student Committee, 2013–2014.

Sprouts Food Co-op cook, 2013-2015.

Organizing committee member of PIMS YRC, Vancouver, Canada, 2014.

Grader for Euclid Mathematics Contest, 2011.

Greater Vancouver Regional Science Fair Committee Member, 2008–2010.

Physics Olympics Volunteer, 2006,2007.

Last updated: December, 2020