

CURRICULUM VITAE
IKJYOT SINGH KOHLI, PH.D.

PERSONAL INFORMATION:

Address: *Schulich School of Business, Room G234 111 Ian MacDonalld Blvd, North York, Ontario, M3J1P3*

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Citizenship: Canadian

Date of Birth: December 10, 1985

Marital Status: Single

RESEARCH INTERESTS

Optimization techniques of black-box AI/ML models, Dynamical systems theory, continuous time Neural Networks, neural networks and deep learning, quantization of neural networks, General Relativity, Mathematical Cosmology.

EDUCATION

York University, Toronto, Ontario

Ph.D. in Mathematical Physics **2014**

Dissertation: "Topological Dynamical Systems Methods in Early-Universe Cosmologies"

Dissertation Advisor: M.C. Haslam

York University, Toronto, Ontario

M.Sc. in Mathematical Physics **2012**

Thesis: "A Bianchi Type IV Viscous Fluid Model of the Early Universe"

Thesis Advisor: M.C. Haslam

University of Toronto, Toronto, Ontario

Honours B.Sc. Physics Specialist Program, Minor in Mathematics **2010**

Honours Thesis: "Dynamical Chaos in Hyperbolic FLRW Spacetimes"

Thesis Advisor: C.C. Dyer

EMPLOYMENT HISTORY

Schulich School of Business, York University, Toronto, Ontario Lecturer and Course Director – MBAN/MMAI Programs Lecturer and course developer for the MBAN and MMAI programs. Specifically responsible for courses related to Data Science/Machine Learning, AI, Mathematical Statistics, and Numerical Analysis.	2019-Present
Department of Mathematics and Statistics, York University, Toronto, Ontario Professor (Adjunct Status) Research in mathematical aspects of neural networks, dynamical systems, and general relativity.	2019-Present
Deloitte Cognitive Labs Senior Data Scientist Consulting with various businesses on their AI and Machine Learning strategies.	2019-Present
Cineplex, Toronto, Ontario Senior Data Scientist Senior Data Scientist responsible for the implementation and development of all AI and ML models for the various lines of the business. Mathematical consultant for various parts of the business as well.	2017-2019
McMaster University, Hamilton, Ontario Instructor and Course Developer – Big Data Analytics Course/curriculum developer and instructor for McMaster's program in Big Data Analytics.	2017 - 2018
York University, Toronto, Ontario Instructor Member - Graduate Program in Physics & Astronomy Developed and taught an advanced graduate-level course that covered geometric foundations of classical mechanics – symplectic manifolds, differential forms, and geometric quantization.	2016 – 2017
York University, Toronto, Ontario Postdoctoral Fellow – Department of Mathematics and Statistics Research in problems related to dynamical systems and mathematical physics including general relativity, mathematical cosmology, quantum field theory in curved spacetime. Responsible for teaching and organizing a number of courses in the department: Analysis, Calculus, Partial Differential Equations, and Ordinary Differential Equations.	2015 – 2017

RBC, Toronto, Ontario

Senior Analyst, Analytics

2015

Worked as a senior analyst within the Operational Risk group developing predictive models to forecast the bank's operational risk exposure.

York University, Toronto, Ontario

Research Assistant

2011 – 2014

Worked on problems in General Relativity, Dynamical Systems Theory, and Fluid Mechanics.

University of Toronto, Toronto, Ontario

Advanced Physical Laboratories Researcher

2007 – 2010

Performed several advanced-level experiments involving the use of the cloud chamber, 3-D conductivity, high energy physics, magnetization, and other special projects.

UNIVERSITY TEACHING EXPERIENCE

Schulich School of Business, York University, Toronto, Ontario

Lecturer/Course Developer – MBAN and MMAI

2019 - Present

MBAN 6510 – Artificial Intelligence II

MBAN 6110 – Data Science I

MBAN 6120 – Data Science II

MMAI 5200 – Algorithms for Business Analysis (Course Director)

MMAI 5300 – Numerical Methods and Analysis (Course Director)

MMAI 5090 – Business Applications of Artificial Intelligence

MMAI 5500 – Applications of Neural Networks and Deep Learning in Business

MMAI/MBAN - Summer Workshop in Mathematics and Statistics for AI

Schulich Executive Education Centre (SEEC), York University, Toronto, Ontario

Lecturer/Course Developer

2019 - Present

Artificial Intelligence (AI) – Based Marketing and Advertising Program

Artificial Intelligence (AI) in FinTech for Company Growth

McMaster University, Hamilton, Ontario

Lecturer/Course Developer – Big Data Analytics Program

2017 - 2018

BDA101 – Data Analytics and Modeling

BDA102 – Big Data Analytics

BDA104 – Predictive Modelling and Data Mining

York University, Toronto, Ontario

Lecturer and Course Director – Department of Mathematics and Statistics **2016 - 2017**

MATH2270 – Differential Equations – VIDEO Lectures -

<https://youtu.be/ET1A6pRQLvI>

MATH1013 – Calculus I

York University, Toronto, Ontario

Lecturer and Course Director – Department of Physics and Astronomy **2016 - 2017**

PHYS 6213 – Advanced Topics in Classical Mechanics – Graduate course

York University, Toronto, Ontario

Lecturer and Course Director – Department of Mathematics and Statistics **2015-2016**

MATH3271 - Partial Differential Equations for Mathematical Physics

MATH1300 - Analysis I

Head Teaching Assistant – Department of Mathematics and Statistics **2011-2014**

(Duties included lecturing, marking of tests/assignments, and holding office hours)

MATH1013 – Applied Calculus I

MATH1025 – Applied Linear Algebra

Math/Stats Lab – General small-group tutor for a range of first and second-year mathematics courses

Head Teaching Assistant – Faculty of Science **2011-2014**

(Duties included lecturing, marking of tests/assignments, lab demonstrations, and holding office hours)

PHYS1510 – Introduction to Physics

PHYS2030 – Computational Methods for Physicists and Engineers

NATS1810 – Energy

NATS1840 – Science, Technology, and the Environment

PUBLICATIONS AND PAPERS**PEER-REVIEWED PUBLICATIONS**

- "Einstein's Field Equations as a Fold Bifurcation"*, I.S. Kohli and M.C. Haslam
Journal of Geometry and Physics, vol. 123 – 434-437 arXiv: 1607.05300[physics.gen-ph] 2017
- "An Analysis of the Replicator Dynamics for an Asymmetric Hawk-Dove Game"*, I.S. Kohli and M.C. Haslam
International Journal of Differential Equations, vol. 2017, 8781570 – arXiv: 1607.05192[math.DS] 2017
- "The Osgood Criterion and Finite-Time Cosmological Singularities"*, I.S. Kohli
Annalen Phys. 528 (2016) no.7-8, 603-611, arXiv: 1507.02241[gr-qc] 2016
- "Stochastic Eternal Inflation in a Bianchi Type I Universe"*, I.S. Kohli and M.C. Haslam
Physical Review D, vol. 93, no. 2, pp.023513, arXiv: 1508.02670 2016
- "Mathematical Issues in Eternal Inflation"*, I.S. Kohli and M.C. Haslam
Classical and Quantum Gravity, vol. 32, no. 7, pp. 075001, arXiv: 1408.2249[gr-qc] 2015
- "Dynamics of a Closed Viscous Universe"*, I.S. Kohli and M.C. Haslam
Physical Review D, vol. 89, no. 4, pp. 043518, arXiv: 1311.0389[gr-qc] 2014
- "Dynamical Systems Approach to a Bianchi Type I Viscous MHD Model"*, I.S. Kohli and M.C. Haslam
Physical Review D, vol. 88, no. 6, pp. 063518, arXiv: 1304.8042[gr-qc] 2013
- "Future Asymptotic Behavior of a nontilted Bianchi Type IV Viscous Model"*, I.S. Kohli and M.C. Haslam
Physical Review D, vol. 87, no.6, pp. 063006, arXiv: 1207.6132[gr-qc] 2013

PREPRINTS/WORKS IN PROGRESS

- "Dynamics of a Vacuum Bianchi Type V Universe with Arbitrary Cosmological Constant"*, I.S. Kohli
arXiv:1609.01310 [gr-qc] 2016
- "A Degenerate Bogdanov-Takens Normal Form for FLRW Cosmologies"*, I.S. Kohli and M.C. Haslam
arXiv:1607.02401 [gr-qc] 2016
- "On Past Singularities in $k=0$ FLRW Cosmologies"*, I.S. Kohli
arXiv:1602.02456 [gr-qc] 2016

- “On Singularities in Cosmic Inflation”*, I.S. Kohli
arXiv: 1505.07770 [gr-qc] 2016
- “Exploring Vacuum Energy in a Two-Fluid Bianchi Type I Universe”*, I.S. Kohli and M.C. Haslam
arXiv: 1402.1967[gr-qc] 2015

AWARDS

- Schulich Teaching Excellence Award (2nd Place Overall), \$10,000 Prize
York University – Schulich School of Business 2019
- Schulich Teaching Excellence Top Ten Award (2019)
York University – Schulich School of Business 2019
- Postdoctoral Fellowship, York University – Department of Mathematics and Statistics 2015 – 2017
- Graduate Assistantship, York University – Department of Physics and Astronomy 2011 – 2014

PUBLIC LECTURES / TALKS

- “AI and Applications to Business”*, I.S. Kohli
Invited Talk to Authorizing Managers – Schulich Executive Education
Centre (SEEC) 2019
- “Enabling Automation and AI/ML”*, I.S. Kohli
Invited Talk – Big Data / AI Toronto 2019 2019
- “Enabling Big Data Analytics at Cineplex”*, I.S. Kohli
Invited Talk – Data Marketing Toronto Conference 2018 2018
- “Enabling Predictive Analytics”*, I.S. Kohli
Invited Talk – Toronto Big Data Conference 2018 2018
- “Dynamics of Bianchi II Cosmological Models”*, I.S. Kohli
York University Physics Society 2017
- “Stochastic Eternal Inflation in Heisenberg Universes”*, I.S. Kohli
2016 Midwest Relativity Meeting – Perimeter Institute 2016
- “Dynamical Systems and Cosmology”*, I.S. Kohli
Public Lecture – York University 2014
- “Numerical Methods in Solving Einstein’s Equations for a Closed Universe”*, I.S. Kohli
SONAD Conference (Southern Ontario Numerical Analysis Day) 2014

“ <i>Dynamical Systems Theory</i> ”, I.S. Kohli Invited Lecture – York University Cosmology Group	2014
“ <i>Lectures on Classical Mechanics</i> ”, I.S. Kohli Series of invited lectures on classical mechanics for NATS1810 – York University	2013
“ <i>Dynamics of Plane-Wave Spacetimes</i> ”, I.S. Kohli Public Lecture – York University	2012
“ <i>Dynamical Systems and Game Theory in Economics</i> ”, I.S. Kohli Invited Lecture – SCS0082 – University of Toronto	2011
“ <i>Chaos in General Relativity</i> ”, I.S. Kohli Department of Physics – University of Toronto	2010

MEMBERSHIPS

International Society on General Relativity and Gravitation – Closed-group membership based on number of publications in the fields of general relativity, cosmology, or gravitation.

American Physical Society – Member of the topical group in gravitation, member of the topical group on statistical and nonlinear physics – Member ID# - 61147872

American Mathematical Society

REFEREES

Michael C. Haslam – Associate Professor – Department of Mathematics and Statistics – York University – mchaslam@mathstat.yorku.ca

Peter C. Gibson – Associate Professor – Department of Mathematics and Statistics – York University – pcgibson@mathstat.yorku.ca

Joe Repka – Professor – Department of Mathematics – University of Toronto – repka@math.toronto.edu

George F.R. Ellis – Professor of Applied Mathematics – University of Cape Town – George.ellis@uct.ac.za

Charles C.C. Dyer – Professor – Department of Physics / Astrophysics – University of Toronto – dyer@astro.utoronto.ca

Randy Lewis – Professor – Department of Physics and Astronomy – York University – randy.lewis@yorku.ca

Jeff Kent – CTO – Cineplex – jeffkent1028@outlook.com