

# INDRANIL GHOSH

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## EDUCATION

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Ph.D., Applied Mathematics Massey University	2021-Present Palmerston North, New Zealand-4442
M.Sc., Physics Jadavpur University	2018-2020 Kolkata, India-700032
B.Sc., Physics Jadavpur University	2015-2018 Kolkata, India-700032

## JOURNAL PUBLICATIONS

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- [J1] *Indranil Ghosh*, and David J. W. Simpson, **Renormalisation of the two-dimensional border-collision normal form.** *Int. J. Bifurcation Chaos* 32(12):2250181, 2022. <https://doi.org/10.1142/S0218127422501814>
- [J2] Sishu Shankar Muni, Hammed Olawale Fatoyinbo, and *Indranil Ghosh*, **Dynamical effects of electromagnetic flux on Chialvo neuron map: nodal and network behaviors.** *Int. J. Bifurcation Chaos* 32(09):2230020, 2022. <https://doi.org/10.1142/S0218127422300208>
- [J3] *Indranil Ghosh*, and David J. W. Simpson, **Robust Devaney chaos in the two-dimensional border-collision normal form.** *Chaos* 32, 043120 (2022). <https://doi.org/10.1063/5.0079807>
- [J4a] *Indranil Ghosh*, **Quantum Game Theory - I. Resonance** 26, 671–684 (2021). <https://doi.org/10.1007/s12045-021-1168-2>
- [J4b] *Indranil Ghosh*, **Quantum Game Theory - II. Resonance** 26, 791–812 (2021). <https://doi.org/10.1007/s12045-021-1180-6>
- [J4c] *Indranil Ghosh*, **Quantum Game Theory - III. Resonance** 26, 939–951 (2021). <https://doi.org/10.1007/s12045-021-1193-1>

## PUBLICATIONS IN CONFERENCE PROCEEDINGS

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- [C1] Hammed Olawale Fatoyinbo, Sishu Shankar Muni, *Indranil Ghosh*, Ibrahim Olatunji Sarumi, and Afeez Abidemi, **Numerical bifurcation analysis of improved denatured Morris-Lecar neuron model.** *2022 International Conference on Decision Aid Sciences and Applications (DASA)*. <https://doi.org/10.1109/DASA54658.2022.9765094>
- [C2] Sarath Babu, *Indranil Ghosh*, and B. S. Manoj, **Effort: A New Metric for Roadside Unit Placement in 5G Enabled Vehicular Networks.** *5GWF'2020 Proceedings*. <https://doi.org/10.1109/5GWF49715.2020.9221228>

## PREPRINTS

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- [P1] *Indranil Ghosh*, Sishu Shankar Muni, and Hammed Olawale Fatoyinbo, **On the analysis of a time varying noise-modulated heterogeneous coupled network of Chialvo neurons under the influence of electromagnetic flux.** <https://arxiv.org/abs/2206.04234>
- [P2] Costas J. Efthimiou, Gregory DeCamillis, and *Indranil Ghosh*, **A physics-driven study of dominance space in soccer.** <https://arxiv.org/abs/2202.00414>

## SOFTWARES

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[S1] *Indranil Ghosh*, **QGameTheory: Quantum Game Theory Simulator (v0.1.2)**. *CRAN Repository*, 2020. <https://cran.r-project.org/web/packages/QGameTheory/index.html>

## BLOGS

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*Indranil Ghosh*, **Introduction to Mathematical Optimiztion (with Python)**. <https://indrag49.github.io/Numerical-Optimization/>

*Indranil Ghosh*, **Introductory Football Data Analysis**. <https://realsoccerexpand.netlify.app/>

## RESEARCH AND WORK EXPERIENCE

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**Sirpi Products and Services Pvt. Ltd.**, Bangalore, India August 2020-December 2020.  
*Research Lead and SHEAR Project Lead (Remote)*

**Indian Institute of Space Science and Technology**, Kerala, India. May 2019-June 2019.  
*Computer Science Intern*

## CONFERENCE PRESENTATIONS

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**Understanding the bifurcation structure of robust chaos in piecewise-linear maps using renormalisation.** July 2023  
ICDEA 2023 *Talk (Upcoming)*

**The Bifurcation Structure Within Robust Chaos of Piecewise-Linear Maps** May 2023  
SIAM Conference on Applications of Dynamical Systems (DS23) *Poster (Upcoming)*

**Introduction to mathematical optimization using Python** February 2023  
Python Delhi User Group Meetup, 2023 *Tutorial*

**Bifurcation structure of robust chaos in two-dimensional piecewise-linear maps** December 2022  
New Zealand Mathematical Society Colloquium, 2022 *Talk*

**Bifurcation structure of robust chaos in 2D piecewise-linear maps** November 2022  
Dynamical Systems in NZ - Castaways, 2022 *Invited Talk (E-poster)*

**Unconstrained Numerical Optimization using Python** August 2022  
Kiwi Pycon XI, 2022 *Tutorial*

**Dynamical Effects of Electromagnetic Flux on Chialvo Neuron Map: Nodal and Network Behaviors** July 2022  
SIAM Conference on the Life Sciences, 2022 *Talk*

**Renormalisation of the Two-Dimensional Border-Collision Normal Form** July 2022  
SIAM Annual Meeting, 2022 *Talk*

**Renormalisation of the Two-Dimensional Border-Collision Normal Form** July 2022  
NSW ANZIAM 2022 Mid-Year Conference, 2022 *Talk*

<b>Dynamical effects of electromagnetic flux on Chialvo neuron map: nodal and network behaviors</b>	April 2022
BAMC, 2022	<i>Talk</i>
<b>Renormalisation of the Two-Dimensional Border-Collision Normal Form</b>	February 2022
ANZIAM Annual Conference, 2022	<i>Talk</i>
<b>Learn Football Data Analysis with Python</b>	December 2021
PyCode Conference, 2021	<i>Talk</i>
<b>Football (soccer) data analysis: A Pedagogic introduction</b>	October 2021
PyCon Taiwan, 2021	<i>Talk</i>
<b>An introduction to hands-on football data analysis in Python</b>	October 2021
PyCon Espana, 2021	<i>Talk</i>
<b>Football (soccer) data analysis: A pedagogic introduction</b>	September 2021
PyConline AU, 2021	<i>Talk</i>
<b>Introduction to Soccer Pass Network Analysis with Python</b>	July 2021
PyOhio, 2021	<i>Thunder Talk</i>
<b>Introducing a blog: Introductory Football Data Analysis</b>	July 2021
EuroPython Conference, 2021	<i>Lightning Talk</i>
<b>Using Python to start learning Unconstrained Numerical Optimization Algorithms</b>	June 2021
Pycon Colombia, 2021	<i>Talk</i>
<b>QGameTheory: An R package for teaching quantum computing and quantum game theory to students</b>	April 2021
International Series of Online Research Software Events (SORSE)	<i>Poster Presentation + Talk</i>
<b>QGameTheory: A Quantum Game Theory Simulator written in R for teaching quantum computing and game theory to starting programmers and undergraduate students</b>	March 2021
APS March Meeting 2021	<i>Poster Presentation</i>
<b>Develop and Document Your First R Package</b>	December 2020
Sirpi Products and Services Pvt. Ltd.	<i>Talk</i>
<b>Learn Lambda Calculus with Python</b>	December 2020
Pycode Conference 2020	<i>Talk</i>
<b>Teaching quantum computing and game theory with QGameTheory package</b>	September 2020
Why R? 2020 Conference	<i>Talk</i>
<b>Introducing Lambda Calculus with Python</b>	September 2020
Pycon Australia	<i>Talk</i>
<b>Quantum Game Theory with Julia: A computational analysis</b>	July 2020
JuliaCon	<i>Poster presentation</i>

**Build Your Own Quantum Simulator With R**  
The European R Users Meeting

June 2020  
*Lightning talk*

**A Computational Study of Sequential Deposition: A Dynamic Monte Carlo Process in Statistical Physics**  
Flatlands and beyond (2019) – A meet on 2D materials

September 2019  
*SNBNCBS, Kolkata, India*

**A Python implementation of Quantum Evolutionarily Stable Strategy Game, an interdisciplinary study of Quantum Computation and Game Theory in population biology**  
February 2019  
SLAS Conference

*Washington D. C, USA*

**Analysis of Quantum Game Theoretic Models with a Python Simulator**  
SciPy India

December 2018  
*IIT-B, Mumbai*

**Analysis of Chaos Game Simulator in Pygame**  
International Conference on Complex Dynamical Networks, 2018

October 2018  
*ISI, Kolkata*

**Computation of Analytic Structure Factor for Macromolecules**  
Research Topic of Statistical Physics to young Physicists, 2018

June 2018  
*SNBNCBS, Kolkata, India*

## TUTORING/MARKING

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Marking assistant for Calculus.  
Marking assistant for Linear Algebra.

## SERVICE

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**Journal Referee**

Chaos: An Interdisciplinary Journal of Nonlinear Science

## SKILLS

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<b>Softwares</b>	Expert: R, Python, Fortran, git, L <sup>A</sup> T <sub>E</sub> X, HTML, Markdown
<b>Social</b>	Twitter: @indraghosh314, Github: <a href="https://github.com/indrag49">https://github.com/indrag49</a> ,

## REFERENCES

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- [R1] *David J. W. Simpson* (Ph.D. Supervisor). *Email: [d.j.w.simpson@massey.ac.nz](mailto:d.j.w.simpson@massey.ac.nz)* <https://www.massey.ac.nz/~djwsimps>
- [R2] *Robert McLachlan* (Ph.D. Co-supervisor). *Email: [r.mclachlan@massey.ac.nz](mailto:r.mclachlan@massey.ac.nz)* <https://www.massey.ac.nz/~rmclachl/>