Jonathan Chávez-Casillas — Résumé

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Professional Experience

University of Rhode Island — **Kingston, RI, USA**
Assistant Professor — *Aug. 2017 – present*

University of Calgary — **Calgary, AB, Canada**
PIMS-Postdoctoral Fellow — *Aug. 2015 – Jul. 2017*

Tokyo University — **Tokyo, JP**
Visiting Researcher — *Feb. 2015*
Invited for 3 weeks to participate in a research project with Prof. Nakahiro Yoshida

Purdue University — **West Lafayette, IN, USA**
Teaching Assistant — *Aug. 2010 – Jul. 2015*
Lecturer for Algebra and Trigonometry, Recitation instructor for Calculus II and Calculus III.

National Polytechnic Institute — **Mexico City, Mexico**
Visiting Professor — *Jan. 2009 – Jun. 2009*
Professor for the courses in Theory of Interest and Financial Engineering.

Current Research interests

Probability, Stochastic Analysis, and its Applications. In Mathematical Finance I am interested particularly in High Frequency Trading: Limit Order Book modeling and optimal placement and execution in a Limit Order Book. I am also interested in Optimization and Control problems, derivative pricing, and hedging. On other areas, I am also interested in the applications of point process to the modeling of epidemics such as the current COVID-19 epidemics, while also, lately I have been interesting in forecasting different stochastic phenomena occuring within our oceans.

Education

Purdue University — **West Lafayette, IN, USA**
PhD in Mathematics, Adviser: Dr. José E. Figueroa-López — *Aug. 2009 – Jul. 2015*
Thesis topic: Limit Order Books: modeling and dynamics. GPA 3.72

Purdue University — **West Lafayette, IN, USA**
MSc. in Computational Finance — *Aug. 2010 – May 2015*

Universidad Anáhuac — **México City, MEX**
BSc in Applied Mathematics, Adviser: Dr. Esteban Chávez-Casillas — *Aug. 2005 – Dec. 2008*
Thesis: On the numerical solution of High Order PDE using Stochastic Processes.
GPA 9.22 (in a scale 1-10)

Publications

- Chávez-Casillas, J.,
  A time-dependent Markovian model of a limit order book. Computational Economics. *2023.* **DOI:** *10.1007/s10614-023-10356-9*.
- Agarwal, V., Chávez-Casillas, J., Mouw, C,.
  Sub-monthly prediction of harmful algal blooms based on automated cell imaging. Harmful Algae. *2023.* **DOI:** *10.1016/j.hal.2023.102386*
- Chávez-Casillas, J., Elliott, R., Swishchuk, A., Remillard, B.,
  A level-1 Limit Order book with time dependent arrival rates. Methodology and Computing in Applied Probability 21 (3): 699-719, *2019.* **DOI:** *10.1007/s11009-019-09715-7*.
  Available at `https://arxiv.org/abs/1704.06572`.

- Swishchuk, A., Remillard, B., Elliott, R., Chávez-Casillas, J.,
  Compound Hawkes processes in limit order books. Handbook of Applied Econometrics: Financial Mathematics, Volatility and Covariance Modelling (2). Taylor & Francis. *2019.* **DOI:** *10.4324/9781315162737*.
  Available at `https://arxiv.org/abs/1712.03106`.
- Chávez-Casillas, J. and Figueroa-López, J.E.,
  One-level limit order books with sparsity and memory. Stochastic Processes and their Applications 127 (8): 2447-2481, *2017.* **DOI:** *10.1016/j.spa.2016.11.005*.
  Available at `http://arxiv.org/abs/1407.5684`.
- Hernández-Cerón, N., Chávez-Casillas, J.A., Feng, Z
  Discrete stochastic metapopulation model with arbitrarily distributed infectious period. Mathematical biosciences 261: 74-82. *2015.* **DOI:** *10.1016/j.mbs.2014.12.003*.
  Available at `http://www.math.purdue.edu/~fengz/pub/MBS_15_p1.pdf`

Articles in Submission

- Chávez-Casillas, J.
  A Stochastic Model for the Early Stages of Highly Contagious Epidemics by using a State-Dependent Point Process. 2023. **Submitted.** Available at `https://arxiv.org/pdf/2209.08612.pdf`.
- Agarwal, V., Chávez-Casillas, J., Inomura, K., Mouw, C.
  Patterns in the temporal complexity of global chlorophyll concentration. 2023. **Submitted.**

Grant Activity

- **NSF LEAPS-MPS:** Improving public policy and decision-making in Epidemiology and High-Frequency trading with the aid of point- processes. $250,000. 2023. **Not Funded**.
- **Travel Grant:** Beaupre Hope and Heritage Fund. $1,200. 2021.
- **NSF LEAPS-MPS:** Development and Applications of Point Processes to Epidemiology and High-Frequency Trading. $250,000. 2021. **Not Funded**.
- **Travel Grant:** Beaupre Hope and Heritage Fund. $1,200. 2019.
- **Research Grant:** Price Volatility Modeling in a Limit Order Book. PI: Anatoliy Swishchuk. IFSID, Montréal. Amount: $40,000 CAD. Project Period: 2015-2017. Role: Co-PI. $30,000 CAD will be given to me for supplemental salary, travel costs and equipment rent.

Teaching Experience

- MATH 571, **Numerical Analysis, graduate level**, Fall 2022. *URI.*
- MATH 471, **Introduction to Numerical Analysis**, Fall 2022. *URI.*
- AMS/DSP 393G, **Introduction to Predictive Analytics**, Spring 2019, 2022, 2023. *URI.*
- MATH 552, **Mathematical Statistics, graduate level**, Spring 2020, 2021. *URI.*
- MATH 453, **Basic Random Processes**, Spring 2018, 2020. *URI.*
- MATH 452, **Mathematical Statistics**, Spring 2020, 2021. *URI.*
- MATH 451, **Introduction to Probability and Statistics**, Multiple semesters. *URI.*
- MATH 435, **Mathematical Analysis and Topology I**, Fall 2020. *URI.*
- MATH 362, **Advanced Engineering Mathematics**, Fall 2017, Fall 2021. *URI.*
- MATH 244, **Differential Equations**, Summer 2021, Summer 2023. *URI.*
- MATH 215, **Introduction to Linear Algebra**, Fall 2017, Spring 2019. *URI.*
- MATH 106, **Mathematics of Social Choice and Finance**, Multiple semesters. *URI.*
- MATH 375, **Differential Equations for Engineers and Scientists**, Fall 2016. *University of Calgary.*
- MATH 249, **Introductory Calculus**, Fall 2015. *University of Calgary.*
- MATH 153, **Algebra And Trigonometry**, Fall 2014. *Purdue University.*

Financial and Computational skills

Probability, Stochastic Analysis, PDE, Valuation of derivatives and Risk Management. High Frequency Trading, in particular modeling Limit Order Books and Optimal placement in a Limit Order Book. R, Matlab, LaTeX, Visual Basic. Simulation methods. Monte Carlo and Quasi Monte Carlo methods. Optimization methods for simulations. Numerical analysis.

Conferences, Talks and posters

August 2023 (*Contributed*): Adaptive Optimal Market Making Strategies with Inventory Liquidation Cost. *ICIAM*, Tokyo, Japan.

June 2023 (*Contributed*): Adaptive Optimal Market Making Strategies with Inventory Liquidation Cost. *SIAM Financial Mathematics*, Philadelphia, PA, USA.

November 2022 (*Invited*): Adaptive Optimal Market-Making Strategies with Inventory Liquidation Costs. *Mathematical Finance Seminar*, WPI, USA.

July 2022 (*Invited*): Organized a mini-symposium on Mathematical Finance for the *2022 SIAM Annual Meeting.* Pittsburgh, PA, USA.

July 2022 (*Invited*): A Self-Exciting Point Process with a State-Dependent Intensity to Model the COVID-19 Epidemics.*2022 SIAM Annual Meeting.* Pittsburgh, PA, USA.

October 2021 (*Invited*): Modeling a limit order book model with time dependent rates under two scenarios.*5th Eastern Conference on Mathematical Finance*, Cornell University, NY, USA.

February 2020 (*Invited*): Green, Brown, Einstein, and Probability? *Math/Stat Lunch talk*, Mount Holyoke University, MA, USA.

December 2019 (*Contributed*): A level-1 Limit Order Book model with time dependent rates. *XV Clapem*, Mérida, México.

December 2018 (*Invited*): Applications of Self-exciting Point Processes in High-Frequency Trading. *Probability and Stochastic Processes Seminar*, WPI, MA, USA.

October 2018 (*Invited*): Dinámica del Precio en un libro de órdenes límite con tasas dependientes del tiempo. *Seminario de Probabilidad y Procesos Estocásticos*, UNAM, CDMX, México.

June 2018 (*Invited*): Dinámica del Precio en un Mercado de Órdenes Límite. *Mexican Mathematicians in the World*, BIRS Oaxaca, OAX, Mexico.

October 2017 (*Contributed*): Price Dynamics in a Limit Order Market under Time Dependent Order Flow. *INFORMS Annual Meeting 2017* Houston, TX, USA.

September 2016 (*Invited*): An introduction Limit Order Book modeling. A model with time dependent rates. *Postdoctoral Retreat in Stochastics.* Banff Research Center, Banff, AB. Canada.

June 2016 (*Contributed*): Price Dynamics in a Level-1 Limit Order Book with time dependent rates. *International Workshop on Applied Probability.* Toronto, ON. Canada.

June 2016 (*Contributed*): A one level Limit Order Book with variable spread, a simulation approach. *CORS.* BIRS, AB. Canada.

January 2016 (*Invited*): An introduction to the wind energy markets: modeling and forecasting. University of Calgary, AB. Canada.

September 2015: Long-Run Price Dynamics under a Level-1 LOB with Memory and Variable Spread. *Lunch at the Lab.* University of Calgary, AB. Canada.

September 2015: Understanding and Modeling Limit Order Books. *Lunch at the Lab.* University of Calgary, AB. Canada.

September 2015: Long-Run Price Dynamics under a Level-1 LOB with Memory and Variable Spread. *Postdoctoral Retreat in Stochastics.* Banff Research Center, Banff, AB. Canada.

November 2014: Long-Run Price Dynamics under a Level-1 LOB with Memory and Variable Spread. *SIAM Conference on Financial Mathematics & Engineering.* Chicago.

March 2014: A one level Limit Order Book with variable spread, a simulation approach. *Computational Finance Seminar.* Purdue University.

October 2013: Long-run price dynamics under a level-1 LOB with memory and variable spread. *The 5th Annual Modeling High Frequency Data in Finance. Hoboken, NJ* Stevens Insititute of Technology.

October 2013: A one level Limit Order Book with variable spread.
Student Colloquium. Purdue University.

October 2012: A one level Limit Order Book with variable spread.
SACNAS National Conference. Seattle, WA.

Academic Awards and Distinctions

2015-2016: Awarded a PIMS Post-doctoral Fellowship in Stochastics

March 2013: Travel support to SIAM Conference on Financial Mathematics & Engineering, Chicago, IL.

October 2013: Travel support to The 5th Annual Modeling High Frequency Data in Finance, Stevens Insititute of Technology, NJ.

October 2012: Travel support to SACNAS National Conference, Seattle

Aug. 2009 – May 2014: Scholarship to study a graduate program outside Mexico. Conacyt, Mexico.

Aug. 2009 – Jul. 2015: Teaching Assitantship, Purdue University.

2008: Honourific Mention in the First National Mathematics Contest "Guillermo Moreno".

2005-2008: Full Scholarship in Anáhuac University.

2005: Selected to be one of two delegates to represent México in the National Youth Science Camp (WV, USA).

2005: First place in the VIII National Mathematics Competition "A. N. Kolmogorov", organized by the Anáhuac University.

2005: Selected to be one of the 10 candidates for being a Mexican delegate in the XLVI International Mathematical Olympiad.

2005: First place in the XV Metropolitan Chemical Olympiad, level "A".

2004: First place in the XVIII Mexican Mathematical Olympiad.

2004: First place in the IV Regional Mathematical Olympiad.

2004: First place in the XVIII Mexican Mathematical Olympiad of the "Distrito Federal".

2003: Second place in the XVIII Mexican Mathematical Olympiad.

2003: Second place in the XII Mexican Chemical Olympiad, level "B".

2003: First place in the XIII Metropolitan Chemical Olympiad, level "B".

2003: First place in the 2003 edition of the National Contest "Pierre Fermat".

2002: 3rd Place in the 2002 edition of the National Contest "Pierre Fermat".

2001: Honourific Mention in the XVI Mexican Mathematical Olympiad.

Languages

Spanish: Native

English: Fluent

Japanese: Threshold, Intermediate