

# MARK PIRAINO

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## ACADEMIC APPOINTMENTS

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**RTG Postdoctoral fellow**  
Northwestern University

*September 2019 - present*

## EDUCATION

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**University of Victoria**  
Ph.D. in Mathematics

*August 2019*

**DePaul University**  
M.S. in Pure Mathematics (with distinction)

*June 2015*

**DePaul University**  
B.S. in Chemistry and Mathematics

*June 2014*

## CERTIFICATES

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**Northwestern University School of Professional Studies**  
Data Science and Visualization

*December 2020 (expected)*

**Coursera**  
Deep Learning

*September 2020*

## RESEARCH INTERESTS

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I am interested in a variety of problems most of which sit at the intersection of ergodic theory, dynamical systems, probability, and statistical mechanics. These include topics such as random matrix products, factor maps, sub-additive thermodynamic formalism, ergodic properties of equilibrium states, and phase transitions.

## PUBLICATIONS

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- Transfer operators and limit laws for typical cocycles. (joint with Kiho Park)  
*submitted*, ArXiv: <https://arxiv.org/abs/2007.02349>
- Single site factors of Gibbs measures.  
*Nonlinearity*, DOI: <https://doi.org/10.1088/1361-6544/ab5179>
- The weak Bernoulli property for matrix Gibbs states.  
to appear in *Ergodic Theory and Dynamical Systems*, DOI: <https://doi.org/10.1017/etds.2018.129>
- Projections of Gibbs states for Hölder potentials.  
*Journal of Statistical Physics*, DOI: <https://doi.org/10.1007/s10955-018-1967-3>

## TEACHING EXPERIENCE

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**Northwestern University**

- Math 220-1: Single-Variable Differential Calculus. (Fall 2019  $\times 2$ )
- Math 220-2: Single-Variable Integral Calculus. (Winter 2020, Fall 2020  $\times 2$ )

**University of Victoria**

- Sessional instructor: Math 100 Calculus 1.

- Tutorial leader: Math 100/101 Calculus, Math 110 Linear Algebra, Math 200 Multivariable Calculus.
- Assistance center tutor: Informal drop in tutoring for 100/200 level mathematics courses.

### DePaul University

- Teaching assistant: MAT 335-336 Real analysis I-II, MAT 150-152 Calculus I-III, MAT 304 Differential Equations.

## INVITED TALKS

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- *Matrix equilibrium states* January 2020  
JMM: Special session on Symbolic Dynamics, Denver CO
- *Matrix equilibrium states* July 2019  
Thermodynamic Formalism: Ergodic Theory and Geometry. Warwick, UK.
- *Single site factors of  $g$ -measures* August 2018  
50 years of Thermodynamic formalism. Leiden, Netherlands.
- *1-Block factors of  $g$ -measures* July 2018  
Topics in Mathematical Physics Satellite to the ICM 2018. São Paulo, Brazil.

## AWARDS AND SCHOLARSHIPS

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- Governor General's gold medal. This is a university wide award given each year to one graduate student for the most outstanding thesis.
- Scholarships: DePaul Scholarship, Welch Scholarship, Graduate Assistantship (DePaul University), UVIC Outstanding Graduate Entrance (2015-2016), UVIC Graduate award (2015-2016, 2018-2019), UVIC Graduate Fellowship (2016-2017).