

Francisco J. Marmolejo-Cossío

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RESEARCH DISCIPLINES

Algorithmic Game Theory, Computational Learning Theory, Decentralised Consensus Protocols, Mechanism Design for Social Good

EDUCATION

University of Oxford, Oxford, UK

- D.Phil. in Computer Science 2015 – 2020
 - Title: “Equilibrium Computation in Games and Strategic Aspects of Bitcoin Mining”
- M.Sc. in Mathematics and the Foundations of Computer Science 2014 – 2015

Harvard University, Cambridge, Massachusetts, USA

- A.B. in Mathematics and Minor in Neurobiology 2008 – 2012
 - Language Citation in Urdu/Hindi

EMPLOYMENT

Harvard University

- Resident Tutor, Lowell House Jun 2022 – Present
- Postdoctoral Fellow Jul 2021 – Present

IOHK

- Research Fellow Apr 2020 – Present

University of Oxford

- Career Development Fellow and Senior Tutor in Computer Science (Balliol College) Sep 2019 – Jul 2021

Mahindra & Mahindra, Mumbai, India

- Deputy Manager (Ivy League Global Recruitment Program) Sep 2012 – Jun 2014

JOURNAL PUBLICATIONS

“Learning Strong Substitutes Demand via Queries”

P. Goldberg, E. Lock, **F. Marmolejo-Cossío**
in *ACM Transactions on Economics and Computation (TEAC)*. Supersedes WINE version below. Jun 2022

“Optimally Deceiving a Learning Leader in Stackelberg Games”

G. Birmpas, J. Gan, A. Hollender, **F. Marmolejo-Cossío**, N. Rajgopal, A. Voudouris
to appear in *Journal of Artificial Intelligence Research (JAIR)*, Supersedes NeurIPS version below.

“Health Sentinel: A mobile crowdsourcing platform for self-reported surveys provides early detection of COVID-19 clusters in San Luis Potosí, Mexico”

S. Ruiz-Correa, R. López-Revilla, F. Díaz-Barriga, **F. Marmolejo-Cossío**, V. Robledo-Valero, E. Hernández-Huérano, L. Álvarez-Rivera, M. Rangel-Martínez, M. Lutzow-Steiner, L. Ortiz-Vázquez, A. Mendoza-Lara M. Olivo-Rodríguez, M. Galván-Ramírez, A. Morales-Neria, V. Martínez-Donjuan, M. Cervantes-Irurzo, A. Comas-García, F. Maldonado, C. Aguilar-Acosta. To appear in *International Journal of Medical Informatics*, Sep 2021.

“Concentrating Pooled COVID-19 Patient Lysates to Improve Reverse Transcription Quantitative PCR Sensitivity and Efficiency”

H. Sanghani, D. Nawrot, **F. Marmolejo-Cossío**, J. Taylor, J. Craft, E. Kalimeris, M. Andersson, S. Vasudevan,
in *Clinical Chemistry*. May 2021.

“Learning Convex Partitions and Computing Game-theoretic Equilibria from Best Response Queries”

P. Goldberg, **F. Marmolejo-Cossío**
in *ACM Transactions on Economics and Computation (TEAC)*. Supersedes WINE version below. Mar 2021.

“Logarithmic Query Complexity for Approximate Nash Computation in Large Games”

P. Goldberg, **F. Marmolejo-Cossío**, and Z. Steven Wu,
in *Theory of Computing Systems (TOCS)*. Supersedes SAGT version below. Jan 2019.

**CONFERENCE
PUBLICATIONS**

“Differential Liquidity Provision in Uniswap v3 and Implications for Contract Design”

Ben Altschuler, Zhou Fan, **F. Marmolejo-Cossío**, David C. Parkes, He Sun, Xintong Wang.
To appear in *Proceedings of 3rd ACM International Conference on AI in Finance (ICAIF)*, Nov 2022.

“Decentralised Update Selection with Semi-Strategic Experts”

G. Amanatidis, G. Birmpas, P. Lazos, **F. Marmolejo-Cossío**
To appear in *Proceedings of 15th International Symposium on Algorithmic Game Theory (SAGT)*, Oct 2022.

“Optimal Testing and Containment Strategies for Universities in Mexico amid COVID-19”

E. Lock, **F. Marmolejo-Cossío**, J. Jonnerby, N. Rajgopal, H. Guzmán-Gutiérrez, L. Benavides-Vázquez, R. Tello-Ayala, P. Lazos
in *Proceedings of 1st ACM Conference on Equity and Access in Algorithms, Mechanisms and Optimization (EAAMO)*, Oct 2021.

“RPPLNS: Pay-per-last-N-shares with a Randomised Twist”

P. Lazos, **F. Marmolejo-Cossío**, X. Zhou, J. Katz
in *Proceedings of 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2021.

“Optimally Deceiving a Learning Leader in Stackelberg Games”

G. Birmpas, J. Gan, A. Hollender, **F. Marmolejo-Cossío**, N. Rajgopal, A. Voudouris
in *Proceedings of Thirty-fourth Conference on Neural Information Processing Systems (NeurIPS)*, Dec 2020.

“Learning Strong Substitutes Demand via Queries”

P. Goldberg, E. Lock, **F. Marmolejo-Cossío**
in *Proceedings of The 16th Conference on Web and Internet Economics (WINE)*, Dec 2020. **Nominated for Best Paper.**

“Fairness and Efficiency in DAG-based Cryptocurrencies”

G. Birmpas, E. Koutsoupias, P. Lazos, **F. Marmolejo-Cossío**
in *Proceedings of 24th International Conference on Financial Cryptography and Data Security (FC)*, Feb 2020.

“Competing (Semi)-Selfish Miners in Bitcoin”

F. Marmolejo-Cossío, E. Brigham, B. Sela, J. Katz
in *Proceedings of 1st ACM conference on Advances in Financial Technologies (AFT)*, Oct 2019.

“Learning Convex Partitions and Computing Game-theoretic Equilibria from Best Response Queries”

P. Goldberg, **F. Marmolejo-Cossío**
in *Proceedings of 14th Conference on Web and Internet Economics (WINE)*.
Selected for forthcoming special edition of *ACM Transactions on Economics and Computation (TEAC)*, Dec 2018.

“Logarithmic Query Complexity for Approximate Nash Computation in Large Games”

P. Goldberg, **F. Marmolejo-Cossío**, and Z. Steven Wu
in *Proceedings of 9th International Symposium on Algorithmic Game Theory (SAGT)*,
Selected for special edition of *Theory of Computing Systems (TOCS)*, Sep 2016.

**REPORTS &
INFORMAL
PUBLICATIONS**

“Novel Practices and Highlights from the Fourth Workshop on Mechanism Design for Social Good”

F. Marmolejo-Cossío, F. Monachou
in *ACM SIGAI AI Matters*, Mar 2021.

“Diagnostica para controlar: cómo maximizar el impacto en el uso de pruebas COVID-19 escasas”

F. Marmolejo-Cossío
in *Consejo Potosino de Ciencia y Tecnología (COPOCYT) TecnoDisruptiva*. Jan 2021.

“Maximising the Benefits of an Acutely Limited Number of COVID-19 Tests”

J. Jonnerby, P. Lazos, E. Lock, **F. Marmolejo-Cossío**, C. Ramsay, D. Sridhar
in *Harvard AI for Social Good Workshop (2020)*.

**ONGOING
PROJECTS**

“Welfare-Maximizing Pooled Testing”

E. Lock, **F. Marmolejo-Cossío**, E. Micha, A. Procaccia

TEACHING

University of Oxford

- Guest Lectures
 - “Cryptocurrencies and Property Law”, *Law and Computer Science*
 - “Online Learning, Mistake Bounds, and the Perceptron Algorithm”, *Computational Learning Theory*
- College Tutorials
 - Linear Algebra, Discrete Mathematics, Computational Learning Theory, Models of Computation, Design and Analysis of Algorithms, Algorithms and Data Structures, Imperative Programming, Functional Programming, Continuous Mathematics, Machine Learning, Introduction to Formal Proof, and Computational Game Theory.

Harvard University

- Course Assistant
 - CS 220: Cryptography Fall 2011
 - Math 112: Real Analysis Spring 2010

SUPERVISION

Postdoctoral Supervision

- Héctor Alonso Guzmán Gutiérrez, IPICyT Jan 2021 – May 2022

M.Sc. Thesis Supervision

- Amrita Khandpur, University of Edinburgh Summer 2020
- Elizabeth Smith, University of Oxford Summer 2019
- Leo Falcomer-Dawson, University of Oxford Summer 2017

Undergraduate Thesis Supervision

- Sarthak Jain, University of Oxford Dec 2020 – Present

REU Supervision

- José Roberto Tello Ayala, ITAM May 2021 – May 2022
- Edna Marlene Martínez Hernández, UANL Summer 2022
- Eira Krystel González Pérez, UISLP Summer 2022

AWARDS & SCHOLARSHIPS

- Finalist for Junior Fellowship, Harvard Society of Fellows 2022
- Best Paper Nomination, WINE 2020
- Computer Science Departmental Teaching Award 2019
- Outstanding Tutor Nomination (university-wide) 2019
- Mexican National Council of Science and Technology (CONACyT) Scholarship 2015 – 2019
- Potosinian Council of Science and Technology (COPOCyT) Scholarship 2014 – 2015

GRANTS

Global Challenges in Economics and Computation

2020 – 2021

Awarded \$ 25, 000 as PI from the ACM Special Interest Group on Economics and Computation (SIGecom) for project titled: “Maximising the Benefits of an Acutely Limited Number of COVID-19 Tests in San Luis Potosí, Mexico”.

SIGAI Activities Grant

2020

Awarded \$1, 200 from the ACM Special Interest Group on Artificial Intelligence (SIGAI) to fund the 4th Workshop on Mechanism Design for Social Good (MD4SG’20) which took place virtually due to the COVID-19 pandemic.

INVITED TALKS AND PANELS (SELECTED)

“**Differential Liquidity Provision in Uniswap v3 and Implications for Contract Design**”, at the *Digital Finance and Technology Session*, INFORMS, Oct 2022.

“**Data Science and Impacted Communities**”, at the *Academic Data Science Alliance Spring Meeting*, May 2022.

“**Fostering Geographical Diversity in Academic Conferences**”, at the *Diversity/PSOR/MIF: Diversity, Equity and Inclusion in OR/MS/Analytics: Innovations in Research and Practice Cluster*, INFORMS, Oct 2021.

“**Maximizing the Utility of a Limited Number of COVID Tests**”, at the *Harvard EconCS Seminar*, Sep 2021.

“**ICWSM and the Global Research Community**”, at the *15th International Conference on Web and Social Media*, Invited Panelist, Jun 2021.

“**Mechanism Design for Social Good: Maximising the Utility of a Limited Number of COVID Tests**”, at the *ELLIS Human-Centric Machine Learning Workshop*, May 2021.

“**Los desafíos de la investigación en tiempos de pandemia: perspectivas desde ángulos diferentes (y complementarios)**”, at the *COPOCyT Interdisciplinary Seminar*, Mar 2020.

“**Optimally Deceiving a Learning Leader in Stackelberg Games**”, at the *UC Boulder Theory Seminar*, Feb 2021.

“**Fairness and Efficiency in DAG-based Cryptocurrencies**,” at the *24th Conference on Financial Cryptography and Data Security*, Sep 2016.

“**Competing (Semi-)Selfish Miners in Bitcoin**” at the *The 1st ACM Conference on Advances in Financial Technology*, Oct 2018.

“**Learning Convex Partitions and Computing Game-theoretic Equilibria from Best Response Queries**,” at the *The 14th Conference on Web and Internet Economics (WINE)*, Dec 2018.

“**Logarithmic Query Complexity for Approximate Nash Computation in Large Games**,” at the *The 9th International Symposium on Algorithmic Game Theory (SAGT)*, Sep 2016.

**ACADEMIC
SERVICE**

Mechanism Design for Social Good (MD4SG)

- Initiative-wide Organizer Jan 2020 – Present
- Latin America and Caribbean Working Group Organizer Jan 2021 – Present
- Development Working Group Organizer Jan 2019 – Jan 2020

Conference Organization

- EAAMO 2022: Funding Chair
- WINE 2021: Global Diversity Chair
- EAAMO 2021: General Chair
- MD4SG 2020: Program Chair

Program Committee Membership

- Tokenomics 2022, EC 2022, EC 2021, NeurIPS 2020, MD4SG 2019

LANGUAGES

- Native Proficiency: English and Spanish
- Fluent: French
- Advanced Proficiency: Urdu/Hindi and Italian