Flavio du Pin Calmon

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Research Interests

Information theory, privacy, trustworthy machine learning, signal processing.

Appointments

Assistant Professor of Electrical Engineering[1] (07/2017 — present)
John A. Paulson School of Engineering and Applied Sciences
Harvard University

Inaugural Data Science for Social Good Post-Doctoral Fellow (2015 — 2017)
IBM T.J. Watson Research Center
Yorktown Heights, NY

Research Intern (2012)
Technicolor Research Lab
Palo Alto, CA

Education

Massachusetts Institute of Technology (MIT), Cambridge, MA
Ph.D. in Electrical Engineering and Computer Science, 2015
Thesis title: Information-Theoretic Metrics for Security and Privacy
Advisors: Muriel Médard and Yury Polyanskiy

Universidade Estadual de Campinas (Unicamp), São Paulo, Brazil
M.Sc. in Electrical Engineering, 2009
Advisor: Michel Daoud Yacoub

Universidade de Brasília, Distrito Federal, Brazil
B.E. in Communications Engineering, 2006

[1] Harvard's Faculty of Arts and Sciences grants appointment extensions and teaching relief to tenure-track faculty, in keeping with policies related to the COVID-19 pandemic, medical leave, and parental leave. Accordingly, Harvard delayed my associate review by 3 years and gave me 2 courses of teaching relief.

Selected Honors and Awards

2023 **Gift from Google Research**
2023 **Lemann Brazil Research Fund Award**, Harvard University.
Also awarded in 2018 and 2019.
2021 **Inaugural Título de Honra ao Mérito (Honor to the Merit Title)** from the Universidade de Brasília. The award is given to alumni who have achieved national and/or international recognition. I was the first alumni chosen in the area of computer science, engineering, statistics, and mathematics.
2021 **Bias^2 Fund Award**, Harvard Data Science Initiative
2021 **Gift from Oracle Research**
2021 **Dean's Competitive Fund for Promising Scholarship**, Harvard University
Also awarded in 2017 and 2019.
2020 **Special Commendation for Extraordinary Teaching in Extraordinary Times**, Harvard
2020 **Amazon Research Award**
2019 **Google Faculty Research Award** in Machine Learning and Data Mining
2019 **NSF Faculty Early Career Development Program (CAREER) Award**
2018 **IBM Open Collaborative Research Award**
2016 **IBM Inaugural Social Good Post-Doctoral Fellowship** for research in data science projects that promote social good
2011 **Avery Alan Ashdown Leadership Award** for outstanding service and leadership to the MIT community
2009 **Irwin Mark Jacobs and Joan Klein Jacobs Presidential Fellowship** for graduate studies at MIT
2006 **Honor of Merit Award from the Brazilian Council of Engineers** for best academic performance in the Communications Engineering graduating class of the University of Brasilia

Selected Student Honors and Awards

2022 **Fundação Estudar Leadership Fellowship**, Lucas Monteiro Paes
Only 30 selected of 33k applicants
2021 **Meta Research Ph.D. Fellowship**, Hsiang Hsu

Teaching

ES 156: Signals & Communications (Harvard SEAS, undergraduate)

This course is required for all EE majors at Harvard SEAS. It provides a comprehensive foundation of signal processing and digital communications. I designed this class after joining Harvard.

Spring 2023	Course rating: 4.5/5	Instructor Rating: 4.7/5
Spring 2021	Course rating: 4.1/5	Instructor Rating: 4.8/5 (co-taught with Todd Zickler)
Spring 2020	Received commendation for "**Extraordinary Teaching in Extraordinary Times**" from Dean of Undergraduate Education (ratings not collected)	
Spring 2019	Course rating: 4.6/5	Instructor Rating: 4.8/5
Spring 2018	Course rating: 4.1/5	Instructor Rating: 4.9/5

Teaching (continued)

ES 250: Information Theory (Harvard SEAS, graduate)

This graduate-level course prepares students for research in information theory. Students learn lossy and lossless compression, channel coding and capacity, and applications of information theory to machine learning and statistics. As a capstone project, students write an ISIT-style paper and present it in a mock conference session in class. I re-designed this class at Harvard

Fall 2022	Course rating: 4.7/5	Instructor Rating: 4.9/5
Fall 2021	Course rating: 4.6/5	Instructor Rating: 5/5
Fall 2019	Course rating: 4.9/5	Instructor Rating: 4.9/5
Fall 2017	Course rating: 4.6/5	Instructor Rating: 4.8/5

CS290b: Seminar on Effective Research Practices & Academic Culture (Harvard SEAS, graduate)

This course is targeted for first-year CS graduate students at Harvard SEAS. It focuses on soft skill building, academic culture, and research and professional-oriented discussion. CS290 was developed by Yaniv Yacoby, John Girash, and David Parkes.

Spring 2023	Course rating: 4.3/5	Instructor Rating: 4.75/5
	(co-taught with Yaniv Yacoby, Eura Shin, Martin Wattenberg, and John Girash)	

The Harvard Business Analytics Program (Harvard SEAS and HBS, professional education)

HBAP is a hybrid on-line and in-person program organized by Harvard SEAS and the Business School (HBS). The program equips mid-career professionals—most in management positions—with skills in analytics, machine learning, artificial intelligence, and digital strategy.

2019 – present Lecturer for the on-campus "immersion" program (2 to 4 yearly lectures)

Tutorials and Short Courses

2022 *Information-Theoretic Tools for Responsible Machine Learning,* tutorial taught at the IEEE International Symposium on Information Theory, Helsinki, Finland

2022 *Mini-Symposium on Theoretical and Applied aspects of Machine Learning,* at Congresso Nacional de Matemática Aplicada e Computacional (CNMAC), Unicamp, Brazil. In addition to organizing and lecturing at the event, I raised funds for speaker travel.

2019 *Privacy and Fairness in Data Science: An Information-theoretic Perspective,* tutorial taught at the IEEE International Symposium on Information Theory, Paris, France

2019 *Dados, Inferência e Aprendizagem (Data, Inference, and Learning),* 2-week short course taught (in Portuguese) at at the Faculdade de Engenharia Elétrica e da Computação (FEEC), Universidade de Campinas (Unicamp), Brazil

Professional Service

2024	Technical Program Committee for the IEEE Information Theory Workshop (ITW)
2023	Organizer of the *Workshop on Information-Theoretic Methods for Trustworthy Machine Learning* at the Simons Institute for the Theory of Computing, Berkeley, California
2023	Organizer of an invited session at the IEEE Conference on Information Sciences and Systems (CISS), Johns Hopkins University
2023	Organizer of an invited session at the Information Theory and Applications Workshop (ITA), San Diego, California
2023	Area Chair for the International Conference on Machine Learning (ICML)
2023	Area Chair for the ACM Conference on Fairness, Accountability, and Transparency (ACM FAccT)
2021	Organizer of the ICML'21 *Workshop on Information-Theoretic Methods for Rigorous, Responsible, and Reliable Machine Learning*
2021 – present	Area Chair for the Conference on Neural Information Processing Systems (NeurIPS)
2019 – 2022	Technical Program Committee for the International Symposium on Information Theory (ISIT)
2019	Publicity Chair for the IEEE North American School of Information Theory (Boston, July 2019).
2018 – present	NSF CISE panelist
2018	Program Committee for the ACM Conference on Fairness, Accountability, and Transparency (ACM FAT*).
2017	Data Jam organizer at the KDD 2017 Broadening Participation in Data Mining Workshop for underrepresented students.
2014 – 2015	Mentor for the MIT undergraduate research opportunities program (UROP)

Journal and conference reviewing: IEEE Trans. on Info. Theory, Journal of Machine Learning Research, ICML, NeurIPS, ACM FAccT Conference, ACM WWW Conference, IEEE Trans. on Wireless Communications, IEEE Trans. on Info. Forensics and Security, IEEE International Symposium on Info. Theory, IEEE Info. Theory Workshop, IEEE International Conference on Communications, IEEE Vehicular Technology Conference

Institute Service at Harvard

2022	Speaker at the *Harvard Brazil Collaboration: Working Together to Advance Knowledge and Education Event*, Museu do Amanhã, Rio de Janeiro, Brazil
2022	Speaker at the *Harvard Brazil Alumni Event*, Rio de Janeiro, Brazil
2022 – present	Computational Science and Engineering (CSE) steering committee
2022 – present	EE Seminar Series organizer
2021 – 2022	EE Faculty Search committee

Institute Service at Harvard (continued)

2022 – present	Hosting Brazilian alumni donors for tours and meetings at the new SEAS building
2020 – 2022	Harvard SEAS Graduate Admissions and Scholarship Diversity committee
2019 – present	Harvard Brazil Studies Program faculty steering committee
2019 – present	Harvard SEAS Engineering Sciences committee on higher degrees
2019 – 2020	EE faculty search committee
2019	Speaker at the *Harvard Brazil Alumni Summit*, São Paulo, Brazil
2018 – 2019	Harvard SEAS EE graduate admissions committee
2018	Harvard Brazil Studies Program faculty advisory committee
2017 – present	Committee member for PhD student qualification exams and defenses, on average 4+ per year
2019 – present	Undergraduate concentration advisor in Electrical Engineering

Current Advising

Graduate Students

2023 – present	Rodrigo Cruz, Applied Math
2022 – present	Alex Oesterling, Computer Science (co-advised with Hima Lakkaraju)
2022 – present	Juan Felipe Gomez, Physics
2021 – present	Carol Long, Applied Math
2021 – present	Lucas Monteiro Paes, Applied Math

Post-Doc Supervision

2024	Claudio Verdun (incoming), Graduation School: Technical University of Munich
2023	Sajani Vithana (incoming), Graduation School: ECE at University of Maryland
2023	Wael Alghamdi (incoming), Graduation School: Harvard SEAS

Undergraduate Research Advisees

2023	Joel Rakhamimov, Harvard EE
2023	Alex Glynn, Harvard CS

Ph.D. Thesis Committee

2023	Maarten Buyl, Ghent University, Thesis Title TBD
2023	He Sun, Harvard CS, Thesis Title TBD
2023	Eric Mibuari, Harvard CS, Thesis Title TBD

Past Advising

Graduate Students

2017 – 2022	Hao Wang, Ph.D. in Applied Math, Harvard SEAS Thesis Title: *Information Theory for Trustworthy Machine Learning* Next Stop: Research Scientist at MIT-IBM Watson AI Lab, Cambridge MA

Past Advising (continued)

2018 – 2022 Hsiang Hsu, Ph.D. in Computer Science, Harvard SEAS
Thesis Title: *Information-Theoretic Tools for Machine Learning Beyond Accuracy*
Next Stop: Research Scientist at J.P. Morgan AI Research, New York NY

2018 – 2022 Wael Alghamdi, Ph.D. in Applied Math, Harvard SEAS
Thesis Title: *Estimation and Optimization of Information Measures with Applications to Fairness and Differential Privacy*
Next Stop: Post-doc at Harvard University

2019 – 2021 Madeleine Barowsky, M.Sc. in Computer Science, Harvard SEAS
(Madeleine was a Ph.D. candidate who chose not to remain in the program in part due to challenges posed by the pandemic.)
Next Stop: Software Engineer at Etsy

Post-Doc Supervision

2020 – 2022 Haewon Jeong
Next Stop: Assistant Professor of ECE, UC Santa Barbara, CA

2019 – 2021 Shahab Asoodeh
Next Stop: Assistant Professor of CS, McMaster University, Canada

2018 – 2020 Berk Ustun (CRCS post-doc)
Next Stop: Assistant Professor at the Halıcıoğlu Data Science Institute, UC San Diego CA

2018 – 2019 Mario Diaz (joint post-doc with ASU)
Next Stop: Investigador Asociado C (tenure-track), Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Universidad Autónoma de México

2018 – 2020 Javier Zazo (CRCS and IACS affiliate, co-supervised with Demba Ba)
Next Stop: Microsoft Research, Cambridge UK

2021 Juwendo Denis
Next Stop: Parallel Wireless, Nashua NH

Undergraduate Senior Thesis and Design Projects

2023 Lucy He, Harvard CS
Thesis Title: *Aleatoric and Epistemic Discrimination: Fundamental Limits of Fairness-Intervention Algorithms in Classification*

2023 Raymond Feng, Harvard CS
Thesis Title: *Adapting Fairness-Intervention Algorithms to Missing Data*

2022 Ethan Cobb, Harvard AM
Thesis Title: *Signal Processing Approaches to Musical Tuning System Detection in Audio*

2022 Peter Winston Michalak, Harvard EE
Thesis Title (ES 100): *An On-line Algorithm for Battery Characterization and Parameter Estimation*

Past Advising (continued)

2021 Alex Mariona, Harvard EE
Thesis Title (ES 100): *Jazzmaster: an Automated Accompaniment System for Jazz Music*

2021 Jamie Caines and Daniela Villafuerte, Harvard EE
Thesis Title (ES 100, joint thesis): *An Automated Non-Contact Screening System*

2020 Marguerite Basta, Harvard CS and EE
Thesis Title: *Convolutional Neural Networks for the Automated Segmentation and Recurrence Risk Prediction of Surgically Resected Lung Tumors*

2020 Zachary Mohamed, Harvard CS
Thesis Title: *Studies in Early Modern Social Networks, 1400-1750*

2020 Miles Wang, Harvard EE
Thesis Title (ES 100): *Automated Detection of Pathologies in Knee MRI Scans*

2019 David Xu, Harvard EE
Thesis Title (ES 100): *Machine Learning for Flavor Development*

2019 Anne Raheem, Harvard EE
Thesis Title (ES 100): *LPWAN Safety Device*

Ph.D. Thesis Committee

2022 Oussama Dhifallah, Harvard AM
Thesis Title: *Estimation and Learning via Convex Optimization: Asymptotics, Phase Transitions, and New Algorithms*

2022 Jefferson da Costa, Institutio Fio Cruz, Brazil
Thesis Title: *Desafios Para a Adoção de Inteligência Artificial Pelo Sistema Único de Saúde (SUS): ética, transparência e interpretabilidade*

2020 Salman Salamatian, MIT EECS
Thesis Title: *Statistical Privacy and Security*

2020 Rohit Agrawal, Harvard CS
Thesis Title: *Deriving Indistinguishability from Unpredictability: Tools and Applications in Pseudorandomness*

2019 Alexandre Campos Moraes, EE at Universidade Estadual de Campinas (Unicamp), Brazil
Thesis Title: *Políticas Públicas de Telecomunicações: Regulação Setorial Brasileira e Governança da Internet*

2019 Surat Teerapittayanon, Harvard CS
Thesis Title: *Intelligence Distribution Network*

2019 Wangyu Luo, Harvard AM
Thesis Title: *Analysis and Generalization of Several Information Processing Methods Related to Stein's Lemma*

Past Advising (continued)

Other Undergraduate Research Advising

2022 Michael Wu, Harvard CS
2020 Jessica Edward, Harvard CS
2019 Charlie Marx, summer research internship, Haverford College
2019 Joesphine Simmons, summer research internship, CMU
2019 Lisa Vo, Harvard CS

Long-Term Visiting Students and Researchers

2023 Dr. Fernando Almeida, Unicamp, Brazil
2022 Bogdan Kulynych, EPFL, Switzerland
2020 Prof. Taesup Moon, Seoul National University
2019 Prof. José Cândido Silveira Santos Filho, Unicamp, Brazil
2019 Behrooz Razeghi, University of Geneva, Switzerland

Research Support

Current

NSF **CIF: Medium: Fundamental Limits of Privacy-Enhancing Technologies (co-PI)**, 2023–2027. PIs: Oliver Kosut (ASU), Lalitha Sankar (ASU). Amount (total/PI share): \$1.2M/\$425k

NSF **FAI: Foundations of Fair AI in Medicine: Ensuring the Fair Use of Patient Attributes (Lead PI)**, 2021–2024. Co-PIs: Elena Glassman (Harvard), Berk Ustun (UCSD). Amount (total/PI share): \$1M/\$625k

NSF **CIF: Small: Approximate Coded Computing - Fundamental Limits of Precision, Fault-tolerance and Privacy (co-PI)**, 2021–2024. PI: Viveck Cadambe (Penn State). Amount (total/PI share): \$600k/\$250k

NSF **CIF: Medium: Collaborative Research: Information-theoretic Guarantees on Privacy in the Age of Learning (co-PI)**, 2019–2024 PIs: Lalitha Sankar (ASU), Oliver Kosut (ASU). Amount (total/PI share) \$1.2M/\$380k.

NSF **CAREER: Information-Theoretic Foundations of Fairness in Machine Learning (Sole PI)**, 2019–2024. Amount: \$540k

Google **Gift from Google**, \$10k, 2023

Harvard **Lemann Brazil Research Fund Award: Information-Theoretic Foundations of Fairness in Machine Learning (Sole PI)**, 2019–2024. Amount: \$150k

Oracle **Gift from Oracle Research**, \$100k, 2021

Amazon **Amazon Research Award**, \$80k, 2020

Research Support (continued)

Harvard **Dean's Competitive Fund For Promising Scholarship (Sole PI)**, Awarded in 2017, 2019, and 2021. Total amount awarded: $158k

Past

NSF **NSF EAGER: AI-DCL: Collaborative Research: Understanding and Overcoming Biases in STEM Education using Machine Learning (Lead PI)**, 2019–2021. Co-PIs: Muriel Médard (MIT), Nilanjana Dasgupta (UMass Amherst). Amount (total/PI share): $300k/$250k.

HDSI **Harvard Data Science Initiative (HDSI) Bias^2 Fund Award**, $48k, 2021

Google **Google Faculty Research Award**, $58k, 2019

IBM **IBM Open Collaborative Research Award**, $50k, 2018

Harvard **Lemann Brazil Research Fund Award**, awarded in the 2018 and 2019 funding cycles. Total amount across awards: $110k

Invited Seminars and Lectures

Note: Selected talks since 2017.

2023

MSRI SLMath Workshop: Randomization, Neutrality, and Fairness, October (upcoming)

MINDS Seminar at Johns Hopkins University, September (upcoming)

Cloudia (Brazilian AI Startup, in Portuguese), June

Stanford Information Theory Forum, May

Simons Institute Workshop on Information-Theoretic Methods for Trustworthy ML, May

Simons Institute TOC4 Fairness Seminary, May

Microsoft Research New England, April

IEEE CISS Conference, March

NSF-IEEE Workshop at University of Maryland, March

School of Public Health of the University of São Paulo, March

Information Theory and Applications Workshop, February

Meeting of the Behring Community (organized by the Behring Foundation), MIT, February

2022

Harvard Data Science Initiative Conference, November

Invited Seminars and Lectures (continued)

PUB Boston Meeting (Pesquisadores Universitários Brasileiros em Boston, in Portuguese), November

Lecture at Fundação Serrapilheira (in Portuguese), October

LIONS Seminar at Arizona State University, September

Science Foundation Ireland Centre for Research Training in Foundations of Data Science, September

Congresso Nacional de Matemática Aplicada e Computacional, Campinas, Brazil, September

Panelist at the Harvard Brazil Collaboration event at the Museu do Amanhã in Rio de Janeiro, Brazil (in Portuguese), August

Speaker at the 2022 Harvard Brazil Alumni Event in Rio de Janeiro, Brazil (in Portuguese), August

DCL Seminar at Georgia Tech, April

Seminario de Probabilidad para estudiantes de posgrado, IMAS/UNAM (Mexico), April

Lecture at MIT 6.S076 – Special Subject in Electrical Engineering and Computer Science, March

Simons Institute Data Privacy: Foundations and Applications Reunion Workshop, March

2021 (On parental leave 2020–2021)

Fórum Permanente: Estratégias para a Inteligência Artificial at Unicamp, Brazil (in Portuguese), April

Fundação Estudar 30 year anniversary event (in Portuguese), March

2020

Carnegie Mellon ECE Seminar, September

Oracle Research (Burlington, MA), February

Information Theory and Applications Workshop (ITA), San Diego, February

Invited speaker at MIT's Special Topics on Signal Processing Course, March

Invited speaker at Carnegie Mellon University's Information Theory Course, March

Harvard SEAS Dean's advisory board, January

2019

Shannon Channel (Youtube), November

New York University ECE Seminar Series, October

Universidade Estadual de Campinas (Unicamp), Campinas, Brazil, August

Invited Seminars and Lectures (continued)

Invited Session on Fairness and Privacy, IEEE International Symp. on Info. Theory, July

Insper Learning Insitution, São Paulo, Brazil, June

Harvard Alumni Summit, São Paulo, Brazil, June

2019 New England Machine Learning Day, May

Hamilton Institute Seminar, NUI Maynooth, Ireland, May

Brown University Data Science Colloquium, April

Anheuser-Busch InBev Board Annual, April

Microsoft Research Seattle, March

Google Research, March

Simons Institute Symposium on Information-Theoretic Methods for Privacy , March

Northeastern University SPIRAL Seminar Series, March

Boston University CISE, February

Information Theory and Applications Workshop (ITA), San Diego, February

2018

Harvard IACS Seminar, November

Seminar at Arizona State University, November

Worcester Polytechnic Institute, Electrical Engineering Seminar, November

Stanford ISL Information Theory Forum, September

Harvard Statistics Seminar, May

Mitsubishi Electric Research Laboratories, April

UMass Amherst Information Theoretic Privacy Workshop, April

Information Theory and Applications Workshop (ITA), February

2017

Machine Learning for Creativity Workshop at SIGKDD'17, Halifax, CA, August

NSF Workshop, University of Delaware, April

Clarification on authorship: I publish and collaborate across areas. Each field has its own conventions for ordering authors. Authorship lists can be alphabetical, represent the order of contribution (usually with students first), have senior PIs ordered by contribution, or have a single lead senior PI as last author. Below, **bold and starred publications**, such as **[J1]***, highlight publications where I am lead senior author, co-lead senior author, or first author.

Journal Publications

[J1]* H. Wang, R. Gao, and **F. P. Calmon**, "Generalization bounds for noisy iterative algorithms using properties of additive noise channels," *J. Mach. Learn. Res., vol. 24, pp. 26–43, 2023.*

[J2] B. Razeghi, **F. P. Calmon**, D. Gunduz, and S. Voloshynovskiy, "Bottlenecks CLUB: Unifying information-theoretic trade-offs among complexity, leakage, and utility," *IEEE Transactions on Information Forensics and Security, vol. 18, pp. 2060–2075, 2023.*

[J3] F. R. A. Parente, **F. P. Calmon**, and J. C. S. Santos Filho, "Unified framework for diversity and coding gains over a broad gaussian class of fading channels," *IEEE Transactions on Vehicular Technology, 2023.*

[J4]* W. Alghamdi and **F. P. Calmon**, "Measuring information from moments," *IEEE Trans. on Inf. Theory (to appear), 2022.*

[J5]* H. Wang, H. Hsu, M. Diaz, and **F. P. Calmon**, "To split or not to split: The impact of disparate treatment in classification," *IEEE Trans. Inf. Theory, vol. 67, no. 10, pp. 6733–6757, 2021.*

[J6]* S. Asoodeh, J. Liao, **F. P. Calmon**, O. Kosut, and L. Sankar, "Three variants of differential privacy: Lossless conversion and applications," *IEEE J. Sel. Areas Inf. Theory, vol. 2, no. 1, pp. 208–222, 2021.*

[J7] D. Wei, K. N. Ramamurthy, and **F. P. Calmon**, "Optimized score transformation for consistent fair classification," *J. Mach. Learn. Res., vol. 22, pp. 258–1, 2021.*

[J8]* H. Hsu, S. Salamatian, and **F. P. Calmon**, "Generalizing correspondence analysis for applications in machine learning," *IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 44, no. 12, pp. 9347–9362, 2022.*

[J9]* H. Jeong, A. Devulapalli, V. R. Cadambe, and **F. P. Calmon**, "ϵ-approximate coded matrix multiplication is nearly twice as efficient as exact multiplication," *IEEE J. Sel. Areas Inf. Theory, vol. 2, no. 3, pp. 845–854, 2021.*

[J10]* H. Hsu, N. L. Martinezgil, M. Bertran, G. Sapiro, and **F. P. Calmon**, "A survey on statistical, information, and estimation—theoretic views on privacy," *IEEE BITS the Information Theory Magazine, vol. 1, no. 1, pp. 45–56, 2021.*

[J11]* M. Diaz, H. Wang, **F. P. Calmon**, and L. Sankar, "On the robustness of information-theoretic privacy measures and mechanisms," *IEEE Trans. Inf. Theory, vol. 66, no. 4, pp. 1949–1978, April 2020.*

[J12]* S. Asoodeh and **F. P. Calmon**, "Bottleneck problems: An information and estimation-theoretic view," *Entropy (invited paper), vol. 22, no. 11, p. 1325, 2020.*

Journal Publications (continued)

[J13] F. R. A. Parente, **F. P. Calmon**, and J. C. S. Santos Filho, "Asymptotic system performance over generalized fading channels with application to maximal-ratio combining," *Journal of Communication and Information Systems, vol. 35, no. 1, pp. 171–180, 2020.*

[J14] J. Liao, O. Kosut, L. Sankar, and **F. P. Calmon**, "Tunable measures for information leakage and applications to privacy-utility tradeoffs," *IEEE Trans. Inf. Theory, vol. 65, no. 12, pp. 8043–8066, Dec 2019.*

[J15]* H. Wang, L. Vo, **F. P. Calmon**, M. Médard, K. R. Duffy, and M. Varia, "Privacy with estimation guarantees," *IEEE Trans. Inf. Theory, vol. 65, no. 12, pp. 8025–8042, Dec 2019.*

[J16] S. Majumdar, B. Han, **F. P. Calmon**, B. Glicksberg, R. Horesh, A. Kumar, A. Perer, E. V. Marschall, D. Wei, A. Mojsilović, and K. Varshney, "Confronting data sparsity to identify potential sources of zika virus spillover infection among primates," *Epidemics, vol. 27, pp. 59–65, June 2019.*

[J17]* **F. P. Calmon**, D. Wei, B. Vinzamuri, K. N. Ramamurthy, and K. Varshney, "Data preprocessing for discrimination prevention: Information-theoretic optimization and analysis," *IEEE J. Sel. Topics Signal Proces, vol. 12, no. 5, pp. 1106–1119, Oct. 2018.*

[J18]* **F. P. Calmon**, Y. Polyanskiy, and Y. Wu, "Strong data processing inequalities for input constrained additive noise channels," *IEEE Trans. Inf. Theory, vol. 64, no. 3, pp. 1879–1892, March 2018.*

[J19] J. Liao, L. Sankar, V. Y. F. Tan, and **F. P. Calmon**, "Hypothesis testing under mutual information privacy constraints in the high privacy regime," *IEEE Trans. Inf. Forensics Security, vol. 13, no. 4, pp. 1058–1071, 2018.*

[J20]* **F. P. Calmon**, A. Makhdoumi, M. Médard, M. Varia, M. Christiansen, and K. R. Duffy, "Principal inertia components and applications," *IEEE Trans. Inf. Theory, vol. 63, no. 8, pp. 5011–5038, 2017.*

[J21]* **F. P. Calmon**, Á. A. M. de Medeiros, and M. D. Yacoub, "Mutual outage probability," *IEEE Trans. Wireless Commun., vol. 16, no. 5, pp. 3138–3150, 2017.*

[J22] M. M. Christiansen, K. R. Duffy, **F. P. Calmon**, and M. Médard, "Multi-user guesswork and brute force security," *IEEE Trans. Inf. Theory, vol. 61, no. 12, pp. 6876 – 6886, Dec 2015.*

[J23] S. Salamatian, A. Zhang, **F.P. Calmon**, S. Bhamidipati, N. Fawaz, B. Kveton, P. Oliveira, and N. Taft, "Managing your private and public data: Bringing down inference attacks against your privacy," *IEEE J. Sel. Topics Signal Proces, vol. 9, no. 7, pp. 1240–1255, 2015.*

[J24] A. Rezaee, **F. P. Calmon**, L. M. Zeger, and M. Médard, "Speeding multicast by acknowledgment reduction technique (SMART) enabling robustness of QoE to the number of users," *IEEE J. Sel. Areas Commun., vol. 30, no. 7, pp. 1270 –1280, Aug. 2012.*

[J25]* **F. P. Calmon** and M. D. Yacoub, "MRCS – selecting maximal ratio combined signals: a practical hybrid diversity combining scheme," *IEEE Trans. Wireless Commun., vol. 8, no. 7, pp. 3425–3429, Jul. 2009.*

Selective Peer-Reviewed Computer Science Conference Publications

[CS1-preprint] A. Oesterling, J. Ma, **F. P. Calmon**, and H. Lakkaraju, "Fair machine unlearning: Data removal while mitigating disparities," *arXiv:2307.14754, 2023.*

[**CS2**]* C. Long, H. Hsu, W. Alghamdi, and **F. P. Calmon**, "Arbitrariness lies beyond the fairness-accuracy frontier," *Accepted to NeurIPS'23* ***(Spotlight)*** *arXiv:2306.09425, 2023.*

[**CS3**]* R. Feng, **F. P. Calmon**, and H. Wang, "Adapting fairness interventions to missing values," *Accepted to NeurIPS'23 arXiv:2305.19429 , 2023.*

[**CS4**]* H. Wang, L. He, R. Gao, and **F. P. Calmon**, "Aleatoric and epistemic discrimination in classification," *Accepted to NeurIPS'23* ***(Spotlight)*** *arXiv:2301.11781, 2023.*

[**CS5**]* W. Alghamdi, J. F. Gomez, S. Asoodeh, **F. P. Calmon**, O. Kosut, and L. Sankar, "The saddle-point method in differential privacy," *Int. Conf. on Machine Learning (ICML), 2023.*

[**CS6**]* B. Kulynych, H. Hsu, C. Troncoso, and **F. P. Calmon**, "Arbitrary decisions are a hidden cost of differentially private training," in *Proc. of the ACM Conference on Fairness, Accountability, and Transparency (FAccT), 2023, pp. 1609–1623.*

[**CS7**]* W. Alghamdi, H. Hsu, H. Jeong, H. Wang, P. W. Michalak, S. Asoodeh, and **F. P. Calmon**, "Beyond ADULT and COMPAS: Fair multi-class prediction via information projection," *Advances in Neural Information Processing Systems (NeurIPS),* ***Oral Presentation****, vol. 35, pp. 38 747–38 760, 2022.*

[**CS8**]* H. Hsu and **F. P. Calmon**, "Rashomon Capacity: A metric for predictive multiplicity in classification," *Advances in Neural Information Processing Systems (NeurIPS), vol. 35, pp. 28 988–29 000, 2022.*

[**CS9**]* L. M. Paes, C. Long, B. Ustun, and **F. P. Calmon**, "On the epistemic limits of personalized prediction," *Advances in Neural Information Processing Systems (NeurIPS), vol. 35, pp. 1979–1991, 2022.*

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