

Héber Hwang Arcolezi

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 [Inria Saclay](#), Palaiseau, 91120, France



Research Interest: Differential Privacy | Information Security | Artificial Intelligence | Algorithmic Fairness.

Employment

Feb 2022 – Present
Postdoctoral Researcher: [Comète team](#) – [Inria](#), [LIX](#), France.
Research: Local differential privacy and ethical aspects of machine learning.
Funding: [ERC Project HYPATIA](#).
Supervisor: [Catuscia Palamidessi](#).

Education

2019 – 2022
Ph.D. in Computer Science: University Bourgogne Franche-Comté ([UBFC](#)), France.
Laboratory: [FEMTO-ST](#) (Franche-Comté Electronique Mécanique Thermique et Optique – Sciences et Technologies).
Research: Production of Categorical Data Verifying Differential Privacy: Conception and Applications to Machine Learning [[thesis link](#)].
Funding: CADRAN project, Region Bourgogne Franche-Comté.
Supervisor: [Jean-François Couchot](#), Univ. Bourg. Franche-Comté, Besançon, France.
Co-supervisor: [Bechara Al Bouna](#), Université Antonine, Hadat-Baabda, Lebanon.
Co-supervisor: [Xiaokui Xiao](#), National University of Singapore, Singapore.
Defense date: 5th January 2022.
Dissertation jury: [Mathieu Cunche](#), *Rapporteur*, INSA Lyon; [Benjamin Nguyen](#), *Rapporteur*, INSA Centre Val de Loire; [Mário S. Alvim](#), *Examineur*, Universidade Federal de Minas Gerais; [Stéphane Chrétien](#), *Examineur*, Université Lyon 2.

2017 – 2019
M.Eng. in Electrical Engineering: São Paulo State University ([UNESP](#)), Brazil.
Laboratory: [LIEB](#) (Laboratório de Instrumentação e Engenharia Biomédica).
Research: A Novel Robust and Intelligent Control Based Approach for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation [[thesis link](#)].
Funding: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).
Supervisor: [Aparecido Augusto de Carvalho](#), São Paulo State University, Brazil.
Defense date: 19th August 2019.
Dissertation jury: [Marcelo A. A. Sanches](#), São Paulo State University; [Raphaël Couturier](#), University Bourgogne Franche-Comté.

2012 – 2017
B.Eng. in Electrical Engineering: Mato Grosso State University ([UNEMAT](#)), Brazil.
Research: Um Estudo Complementar ao Projeto de Controle PID no Caso do Pêndulo Invertido (in Portuguese) [[thesis link](#)].
Supervisor: [Rogério B. Quirino](#), Mato Grosso State University.
Defense date: 20th July 2017.
Dissertation jury: [Rogério Lúcio Lima](#), Mato Grosso State University; [Maria Helena Vieira Kelles](#), Mato Grosso State University.

Mobility

Oct–Dec 2022
Visiting Postdoc at The University of British Columbia – [UBC](#) (2 months): Research on local differential privacy auditing.
Laboratory: [SYSTOPIA](#).
Hosted by Profs. [Mathias Léculyer](#) and [Sébastien Gambs](#).

- Jan 2022 **Visiting Ph.D. Student at Universidade Federal de Minas Gerais – [UFMG](#) (3 weeks):**
Investigation and development of data-driven solutions based on machine learning for applications in medicine.
Laboratory: [EEFFTO](#) / [HRTN](#).
Hosted by Prof. [Ligia de Loiola Cisneros](#).
- Nov 2021 **Visiting Ph.D. Student at Université du Québec à Montréal – [UQAM](#) (1 month):**
Investigation of privacy threats on local differential privacy mechanisms.
Funding: [EIPHI Graduate School](#) (★ **Ph.D. Student Mobility Grant**).
Laboratory: [LATECE](#).
Hosted by Prof. [Sébastien Gambs](#).

Academic Community Service

Program Committee

- 2023 - 6th Conference on Fairness, Accountability, and Transparency ([FAccT 2023](#));
- 4th AAAI Workshop on Privacy-Preserving Artificial Intelligence ([PPAI-23](#));
- 10th IEEE Swiss Conference on Data Science ([SDS 2023](#)).
- 2022 - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases ([ECML/PKDD 2022](#));
- International Conference on Software Engineering Advances ([ICSEA 2022](#)).

Reviewer

- 2023 - IEEE Transactions on Dependable and Secure Computing;
- Information Sciences;
- Applied Soft Computing.
- 2022 - Privacy Enhancing Technologies Symposium ([PETS 2023](#));
- IEEE Transactions on Information Forensics and Security;
- Expert Systems with Applications;
- Information Sciences
- MDPI Modelling;
- IEEE Access.
- 2021 Privacy Enhancing Technologies Symposium ([PETS 2022](#)).
- 2020 Security and Communication Networks.

Conference/Workshop Organization

- 2023 13th Atelier sur la Protection de la Vie Privée (APVP) at [UBFC](#).
- 2022 [1st Comète Workshop on Ethical AI](#) at [Inria Saclay](#), [LIX](#).
- 2017 II Semana da Animação, Modelagem e Automação at [UNEMAT](#).
- 2014 I Semana da Faculdade de Ciências Exatas at [UNEMAT](#).

Volunteer

- 2013-2016 Study Group Leader of the [FOCCO program](#) at [UNEMAT](#) (★ **Scholarship holder**).
- 2016 Co-Founder of the Consulting Junior Enterprise [Energy](#).
- 2014 Tutor on Differential and Integral Calculus at [UNEMAT](#).

Participation in Research Projects

- ELSA** **Title:** [European Lighthouse on Secure and Safe AI](#) (2022 – 2025).
Program: HORIZON Action Grant Budget-Based.
Partners: 26 European institutions (e.g., Inria, CISPA, NVIDIA Switzerland, EPFL).
Role: Project member.

- CRYPTTECS** Title: [Cloud-Ready Privacy-Preserving Technologies](#) (2021 – 2024).
Program: ANR-BMBF French-German Joint Call on Cybersecurity.
Partners: France (Inria, Zama, and Orange) and Germany (The Bosch Group, University of Stuttgart, and Edgeless Systems).
Role: Project member.
- HYPATIA** Title: [Privacy and Utility Allied](#) (2019 – 2024).
Program: ERC – Advanced Grant; HORIZON 2020 research and innovation programme.
Principal Investigator: [Catuscia Palamidessi](#).
Role: Project member (postdoc).

Software Development

Python Core contributor and maintainer of [multi-freq-ldpy](#), a Python package for multiple frequency estimation under local differential privacy. MIT License, [GitHub](#).

Publications: The superscript * indicates equal contributions to the paper.

Summary:

- 8 Journal Articles
- 6 National Conference Papers
- 10 International Conference Papers
- 1 Preprint / Submitted paper

Journal Articles: Classified according to four JCR ([SCImago Journal Rank](#)) quartiles (Q1, Q2, Q3, and Q4) and its Impact Factor (IF), *retrieved in the year of publication*.

Total	Q1	Q2	Q3	Q4	Unranked
8	5	1	0	1	1

- 2022 **Improving the Utility of Locally Differentially Private Protocols for Longitudinal and Multidimensional Frequency Estimates.**
[Arcolezi, H. H.](#); Couchot, J.-F.; Al Bouna, B.; Xiao, X.
 Digital Communications and Networks, Early Access. JCR: **Q1**, IF: **6.348**.
<https://doi.org/10.1016/j.dcan.2022.07.003>
- 2022 **Privacy-Preserving Prediction of Victim's Mortality and Their Need for Transportation to Health Facilities.**
 *[Arcolezi, H. H.](#); *Cerna, S.; Couchot, J.-F.; Guyeux, C.; Makhoul, A.
 IEEE Transactions on Industrial Informatics, vol. 18(8), p.5592-5599. JCR: **Q1**, IF: **11.648**.
<https://doi.org/10.1109/tii.2021.3123588>
- 2022 **Differentially Private Multivariate Time Series Forecasting of Aggregated Human Mobility With Deep Learning: Input or Gradient Perturbation?**
[Arcolezi, H. H.](#); Couchot, J.-F.; Renaud, D.; Al Bouna, B.; Xiao, X.
 Neural Computing and Applications, vol. 34(16), 13355–13369. JCR: **Q2**, IF: **5.102**.
<https://doi.org/10.1007/s00521-022-07393-0>
- 2021 **Machine learning-based forecasting of firemen ambulances' turnaround time in hospitals, considering the COVID-19 impact.**
 Cerna, S.; [Arcolezi, H. H.](#); Guyeux, C.; Royer-Fey, G.; Chevallier, C.
 Applied Soft Computing, vol. 109, p.107561. JCR: **Q1**, IF: **6.725**.
<https://doi.org/10.1016/j.asoc.2021.107561>
- 2021 **RISE Controller Tuning and System Identification Through Machine Learning for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation.**
[Arcolezi, H. H.](#); Nunes, W. R. B. M.; de Araujo, R. A.; Cerna, S.; Sanches, M. A. A.; Teixeira, M. C. M.; de Carvalho, A. A.
 Eng. Applications of Artificial Intelligence, vol. 102, p.104294. JCR: **Q1**, IF: **6.212**.

<https://doi.org/10.1016/j.engappai.2021.104294>

- 2021 **Preserving Geo-Indistinguishability of the Emergency Scene to Predict Ambulance Response Time.**
Arcolezi, H. H.; Cerna, S.; Guyeux, C.; Couchot, J.-F.
Mathematical and Computational Applications, vol. 26(3), p.56. JCR: –, IF: –.
<https://doi.org/10.3390/mca26030056>
- 2020 **Forecasting the Number of Firefighter Interventions per Region with Local-Differential-Privacy-Based Data.**
Arcolezi, H. H.; Couchot, J.-F.; Cerna, S.; Guyeux, C.; Royer, G.; Al Bouna, B.; Xiao, X.
Computers & Security, vol. 96, p.101888. JCR: **Q1**, IF: **3.579**.
<https://doi.org/10.1016/j.cose.2020.101888>
- 2020 **Identifying the knee joint angular position under neuromuscular electrical stimulation via long short-term memory neural networks.**
Arcolezi, H. H.; Nunes, W. R. B. M.; Cerna, S.; de Araujo, R. A.; Sanches, M. A. A.; Teixeira, M. C. M.; de Carvalho, A. A.
Research on Biomedical Engineering, vol. 36(4), p.511-526. JCR: **Q4**, IF: –.
<https://doi.org/10.1007/s42600-020-00089-1>

International Conference Papers: Classified according to four 2021 [CORE](#) rankings (A*, A, B, and C).

Total	A*	A	B	C	Unranked
10	1	3	1	3	2

- 2023 **On the Risks of Collecting Multidimensional Data Under Local Differential Privacy.**
Arcolezi, H. H.; Gambs, S.; Couchot, J.-F.; Palamidessi, C.
International Conference on Very Large Data Bases (**VLDB**). **CORE: A***.
<https://arxiv.org/abs/2209.01684> (published version to appear)
- 2023 **Frequency Estimation of Evolving Data Under Local Differential Privacy.**
Arcolezi, H. H.; Pinzón, C.; Palamidessi, C.; Gambs, S.
International Conference on Extending Database Technology (**EDBT**). **CORE: A**.
<https://arxiv.org/abs/2210.00262> (published version to appear)
- 2022 **(Poster) Multi-Freq-LDPy: Multiple Frequency Estimation Under Local Differential Privacy in Python.**
Arcolezi, H. H.; Couchot, J.-F.; Gambs, S.; Palamidessi, C.; Zolfaghari, M.
European Symposium on Research in Computer Security (**ESORICS**). **CORE: A**.
https://doi.org/10.1007/978-3-031-17143-7_40
- 2021 **Random Sampling Plus Fake Data: Multidimensional Frequency Estimates With Local Differential Privacy.**
Arcolezi, H. H.; Couchot, J.-F.; Al Bouna, B.; Xiao, X.
International Conference on Information and Knowledge Management (**CIKM**). **CORE: A**.
Acceptance rate: 21.7%.
★ SIGIR Student Travel Grant (covered registration fees – virtual attendance).
<https://doi.org/10.1145/3459637.3482467>
- 2020 **Mobility modeling through mobile data: generating an optimized and open dataset respecting privacy.**
Arcolezi, H. H.; Couchot, J.-F.; Baala, O.; Contet, J.-M.; Al Bouna, B.; Xiao, X.
International Wireless Communications and Mobile Computing (**IWCMC**). **CORE: B**.
Acceptance rate: 38%.
<https://doi.org/10.1109/iwcmc48107.2020.9148138>
- 2020 **A Comparison of LSTM and XGBoost for Predicting Firemen Interventions.**

Cerna, S.; Guyeux, C.; Arcolezi, H. H.; Couturier, R.; Royer, G.
World Conference on Information Systems and Technologies (**WorldCIST**). CORE: **C**.
https://doi.org/10.1007/978-3-030-45691-7_39

2020 **Longitudinal Collection and Analysis of Mobile Phone Data with Local Differential Privacy.**

Arcolezi, H. H.; Couchot, J.-F.; Al Bouna, B.; Xiao, X.
IFIP International Summer School on Privacy and Identity Management. CORE: –.
https://doi.org/10.1007/978-3-030-72465-8_3

2020 **Boosting Methods for Predicting Firemen Interventions.**

Cerna, S.; Guyeux, C.; Arcolezi, H. H.; Couturier, R.; Royer, G.
International Conference on Information and Communication Systems (**ICICS**). CORE: –.
<https://doi.org/10.1109/icics49469.2020.239488>

2019 **Long Short-Term Memory for Predicting Firemen Interventions.**

Ñahuis, S. L. C.; Guyeux, C.; Arcolezi, H. H.; Couturier, R.; Royer, G.; Lotufo, A. D. P.
International Conf. on Control, Decision and Information Technologies (**CoDIT**). CORE: **C**.
<https://doi.org/10.1109/codit.2019.8820671>

2019 **A RISE-based Controller Fine-tuned by an Improved Genetic Algorithm for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation.**

Arcolezi, H. H.; Nunes, W. R. B. M.; Nahuis, S. L. C.; Sanches, M. A. A.; Teixeira, M. C. M.; de Carvalho, A. A.
International Conf. on Control, Decision and Information Technologies (**CoDIT**). CORE: **C**.
<https://doi.org/10.1109/codit.2019.8820357>

National Conference Papers.

2021 **Machine Learning Algorithms to Predict In-Hospital Mortality in Patients with Diabetic Foot Ulceration.**

Cisneros, L. L.; Arcolezi, H. H.; Cerna, S.; Brandão, J.L.; Santos, G.C.; Navarro, T.P.; Carvalho, A.A.
Congresso da Sociedade Brasileira de Diabetes (SBD).
https://www.aem-sbem.com/wp-content/uploads/2022/03/25298_Supl.-65_04_ABEM_SBD_2021.pdf

2020 **Prévisions géographiques du nombre d'interventions des pompiers respectant la confidentialité différentielle locale.**

Arcolezi, H. H.; Couchot, J.-F.; Cerna, S.; Guyeux, C.; Royer, G.; Al Bouna, B.; Xiao, X.
Conférence Nationale sur les Applications Pratiques de l'Intelligence Artificielle (APIA).
http://pfia2020.fr/wp-content/uploads/2020/08/Actes_CH_PFIA2020_V3.pdf

2019 **On the Ability to Identify the Knee Joint Position Under Neuromuscular Electrical Stimulation Using Long Short-Term Memory Neural Networks.**

Arcolezi, H. H.; Nunes, W. R. B. M.; de Araujo, R. A.; Cerna, S.; Sanches, M. A. A.; Teixeira, M. C. M.; de Carvalho, A. A.
Conferência Brasileira de Dinâmica, Controle e Aplicações (DINCON).
<http://soac.eesc.usp.br/index.php/dincon/xivdincon/paper/view/1685/1153>

2019 **A Robust and Intelligent RISE-based Control for Human Lower Limb Tracking via Neuromuscular Electrical Stimulation.**

Arcolezi, H. H.; Nunes, W. R. B. M.; de Araujo, R. A.; Cerna, S.; Sanches, M. A. A.; Teixeira, M. C. M.; de Carvalho, A. A.
Conferência Brasileira de Dinâmica, Controle e Aplicações (DINCON).
<http://soac.eesc.usp.br/index.php/dincon/xivdincon/paper/view/1683/1152>

2017 **Um Estudo Complementar do Controle PID Servo e Regulador Aplicado ao Sistema Pêndulo Invertido.**

[Arcolezi, H. H.](#); Quirino, R. B.
Congresso Brasileiro de Educação em Engenharia (COBENGE).
http://www.abenge.org.br/sis_artigos.php

- 2017 **Um Estudo Complementar ao Projeto de Controle PID do Pêndulo Invertido.**
[Arcolezi, H. H.](#); Quirino, R. B.
Congresso Nacional de Pesquisa e Ensino em Ciências (CONAPESC).
<https://editorarealize.com.br/artigo/visualizar/28867>

Preprints / Submitted Papers.

- 2022 **Machine learning-based prediction of revascularization, amputation, and mortality for in-hospital diabetic foot patients.**
Cisneros, L. L.; Cerna, S.; [Arcolezi, H. H.](#); Furtado, M.; Ferreira, H. B.; Navarro, T. P.; Chiavegatto Filho, A.; de Carvalho, A. A.
Submitted to: Diabetes & Metabolic Syndrome: Clinical Research & Reviews.

Co-Supervision

- 2022 – TBD **[Karima Makhoulf](#)**: Ph.D. Student at [Comète team](#) – [Inria](#), [LIX](#).
Main Supervisor: [Catuscia Palamidessi](#) – 50%.
Percentage: 50%.
- 2022 **[Majid Zolfaghari](#)**: Long-term visitor (1 year) in the [Comète team](#) – [Inria](#), [LIX](#), Ph.D. Student from the [Sharif University of Technology \(SUT\)](#).
Main Supervisor (at SUT): Rasool Jalili.
Main Supervisor (at LIX): [Catuscia Palamidessi](#) – 50%.
Percentage: 50%.

Teaching Experience

- 2022 **Teaching Assistant on Introduction to Computer Science with Java at [École Polytechnique](#) (40 hours):** Assist students enrolled in the discipline and evaluate students' tests.
- 2021 **Lecturer at Workshop on Privacy for IoT at [Master IoT UBFC](#) (20 hours):** Theory and practical methods of anonymization for 12 students of Master 1.
- 2020 **Lecturer at Workshop on Privacy for IoT at [Master IoT UBFC](#) (20 hours):** Theory and practical methods of anonymization for 21 students of Master 2.

Tutorials, Invited Talks, Presentations, and Media Interviews

- Oct 2022 **Seminar talk:** Locally differentially private protocols for frequency estimation of longitudinal data. In: **Groupe de travail Protection de la Vie Privée ([GT-PVP](#))**. Online.
- Oct 2022 **Tutorial:** A Brief Introduction to Local Differential Privacy. In: **The University of British Columbia ([SYSTOPIA Lab](#))**. In-person.
- Jun 2022 **Oral presentation:** (*Published Paper*) Random Sampling Plus Fake Data: Multidimensional Frequency Estimates With Local Differential Privacy. In: **[APVP 2022 - 12th Atelier sur la Protection de la Vie Privée](#)**. In-person.
- Jun 2022 **Oral presentation:** (*Tutorial*) Multi-Freq-LDPy: Multiple Frequency Estimation Under Local Differential Privacy in Python. In: **[APVP 2022 - 12th Atelier sur la Protection de la Vie Privée](#)**. In-person.
- Jan 2022 **Invited talk:** Data anonymization and Artificial Intelligence Models (in Portuguese). In: **Hospital Risoleta Tolentino Neves**. Hybrid format (in-person and online). [Media cover](#).

- Nov 2021 **Invited talk:** Improving Utility and Privacy in Multidimensional Frequency Estimates Under Local Differential Privacy. **In: Université du Québec à Montréal ([LATECE Seminar](#))**. Hybrid format (in-person and online).
- Jul 2021 **Invited talk:** Introduction to Privacy Preservation and Machine Learning Techniques in Healthcare (in Portuguese). **In: Universidade Federal de Minas Gerais**. Online.
- Jun 2021 **Oral presentation:** Privacy-Preserving Human Mobility Analytics Through Mobile Phone Data. **In: [APVP 2021 - 11th Atelier sur la Protection de la Vie Privée](#)**. Online.
- Nov 2020 **Media cover:** [Mesure Informatique de Ruptures de Service](#). **In: En Direct** (Université de Franche-Comté).

Languages

Portuguese	Native language
English	Full professional proficiency
French	Professional working proficiency
Spanish	Professional working proficiency