1. BASIC INFORMATION

1.1. Personal details and contact information

Name: Agustin Zuniga
Place of birth: Quito, Ecuador.
Nationality: Ecuadorian.
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00014 University of Helsinki,
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Homepage: https://agustin-zuniga.com/

Google Scholar: https://scholar.google.com/citations?hl=en&user=_0wtJ0EAAAAJ
Researcher ID: https://orcid.org/0000-0002-6481-3559

Postdoctoral Researcher
PhD, MSc, BEng

CV date: 24.05.2024

Language skills
- Spanish — Mother tongue
- English — Excellent (speaking, writing and reading)
- Finnish — Intermediate (reading and listening)

1.2. Academic degrees

Degree: PhD in Computer Science, University of Helsinki, Finland **Period: 2019 – 2023**
Grade: Pass with Distinction
Thesis: *Pervasive Data Science: From Data Collection to End-User Applications*

Degree: MSc in Computer Science, University of Helsinki, Finland **Period: 2016 – 2018**
Major studies: Algorithms, Data Analytics and Machine Learning.
Grade: Eximia Cum Laude Approbator.
Thesis: *Analysis of the Impact of Performance on Apps Retention.*

Degree: Postgraduate Programme in Manufacturing Control and **Period: 2007 – 2009**
Automation, University of Buenos Aires – UBA, Argentina
Final project: *SCADA Framework Evaluation based on Service Oriented Architecture (SOA). Simulator for drilling controlling operations in Oil and Gas Industry.*

Degree: BEng in Informatics and Computing Systems, Pontifical **Period: 2003 – 2006**
Catholic University of Ecuador – PUCE, Ecuador.
Grade: Excellent (Top 1%).
Thesis: *Pattern Recognition using Neural Networks - ART (Adaptative Resonance Theory).*

1.3. Current position

Postdoctoral Researcher **Dec 2023 – Date**
University of Helsinki, Finland
Pervasive Data Science Group

1.4. Previous experience

Research assistant **Jun 2017 – Mar 2019**
University of Helsinki, Finland.
Pervasive Data Science Group

Head of Area   **May 2014 – Aug 2016**
Centre of Hydrocarbons Control and Monitoring, Ecuador.
Area of Automation and Industrial Control Systems

Project Leader in Industrial Control Systems   **Dec 2010 – Apr 2014**
Centre of Hydrocarbons Control and Monitoring, Ecuador
Area of Engineering and Automation

ICS Field Engineer   **Nov 2009 – Nov 2010**
Ministry of Non-Renewable Natural Resources, Ecuador.
Hydrocarbons National Agency

1.5 Short background

Agustin Zuniga is a postdoctoral researcher at the Department of Computer Science, University of Helsinki. He received his PhD in December 2023. His Ph.D. thesis entitled "Pervasive Data Science: From Data Collection to End-User Applications", received a pass with distinction and was awarded the University of Helsinki Doctoral Thesis Prize 2023 for its scientific merit and societal impact. Dr Zuniga's research is dedicated to advancing data quality, sensing and modelling methods in Pervasive Data Science (PDS) and Artificial Intelligence of Things (AIoT). These cutting-edge paradigms integrate the Internet of Things (IoT), pervasive computing, data science and artificial intelligence to address real-world challenges. His primary focus is on developing innovative solutions for intelligent sensing pipelines to support end-user applications and promote sustainable ecosystems. Dr Zuniga has collaborated with prestigious international and local academic researchers and industrial partners on scientific projects in data science, IoT, pervasive sensing, digital health, and mobile distributed systems. He actively contributes to the research community, especially ACM (SIGMOBILE) and IEEE. His publications include highly competitive top-tier conferences and journals such as The Web Conference, IEEE PerCom, ACM IMWUT, and IEEE Pervasive Computing. Dr Zuniga also serves as a reviewer for major conferences and journals, including Scientific Reports, ACM IMWUT, ACM ITICSE, Pervasive and Mobile Computing, and IEEE Pervasive Computing. Dr Zuniga's teaching philosophy bases on constructivism. His teaching experience includes training in higher education pedagogy and participation as co-instructor in introductory and advanced courses in PDS and the IoT. He is also co-creator of the Introduction to the IOT MOOC (https://iot.mooc.fi), which currently has over 600 students, demonstrating his commitment to democratising education.

1.6. Technical skills

- **Operating systems:** Any Linux or Unix-based distributions, Android.
- **Programming:** Python, C++, R, MatLab, Android Studio, Arduino.
- **Other environments:** Spark, LaTex, Jupyter, SPSS, Visual Studio.
- **ICS and SCADA:** Rockwell, Wonderware, Osisoft PI System, Matrikon.

1.7. Positions of responsibility

- **Student Representative** (Jan 2022 – Dec 2023), Doctoral Board of the Doctoral Programme in Computer Science (DoCS), University of Helsinki, Finland.
- **Leader of the Emergency and Rescue Squad** (2014 – 2016), Hydrocarbons Control and Regulation Agency, Ecuador.

2. RESEARCH AND SCIENTIFIC ACTIVITIES

2.1. Significant publications

My research has resulted in 28 peer-reviewed publications in top publication channels. My short list of articles encompasses publications that contribute with (i) developing innovative methods

for enhancing data collection and quality, and (ii) creating novel, cost-effective sensing pipelines to support sustainable development in distributed multi-device contexts across ecosystems.

1. **[The Web Conference] A. Zuniga,** H. Flores, E. Lagerspetz, P. Nurmi, S. Tarkoma, P. Hui, J. Manner, (2019). *Tortoise or Hare? Quantifying the Effects of Performance on Mobile App Retention*, In Proceedings of the WWWW Conference. DOI: 10.1145/3308558.3313428
   - Contribution: Analysis, quantification and modelling of the effect of energy consumption and networking latency in mobile app retention.

2. **[IEEE PerCom]** Flores, H., **Zuniga, A**., Faghihi, F., Li, X., Hemminki, S., Tarkoma, S., Hui, P. and Nurmi, P. (2020). *COSINE: Collaborator Selector for Cooperative Multi-Device Sensing and Computing.* In Proceedings of IEEE International Conference on Pervasive Computing & Communications. DOI: 10.1109/PerCom45495.2020.9127364
   - **Relevancy:** A novel method to select collaborators in multi-device environments based on regularity from Markov trajectory entropy matrix.

3. **[ACM/IEEE IoTDI]** Flores, H., **Zuniga, A.**, Radeta, M., Yin, Z., Liyanage, M., Motlagh, N.H., Nguyen, N.T., Tarkoma, S., Youssef, M. and Nurmi, P., 2024. *SEAGULL: Low-Cost Pervasive Sensing for Monitoring and Analysing Underwater Plastics*. In Proceedings of ACM/IEEE Conference on Internet of Things Design and Implementation (IoTDI). DOI: https://researchportal.helsinki.fi/files/303669638/SEAGULL_IOTDI.pdf
   - **Relevancy:** Cost-effective sensing system for addressing marine pollution by identifying underwater plastics using light sensing and convolutional sparse coding.

4. **[IEEE Comp.]** Radeta M., **Zuniga, A.,** Hossein Motlagh, N., Liyanage, M., Freitas, R., Youssef M., Tarkoma, S., Flores, H. and Nurmi, P. (2022). *Deep Learning and the Oceans*. In, IEEE Computer. 55, 5, p. 39-50 6 p. DOI: 10.1109/MC.2022.3143087
   - **Relevancy:** A research vision and performance evaluation of the use of deep learning in surface and underwater environments for image classification.

5. **[IEEE Perv. Comp.] Zuniga, A.,** Flores, H., and Nurmi, P. (2021). *Ripe or Rotten? Low-Cost Produce Quality Estimation Using Reflective Green Light Sensing.* In IEEE Pervasive Computing, 20(3), 60-67. DOI: 10.1109/MPRV.2021.3074474
   - **Relevancy:** A novel low-cost sensing method for estimating and modelling produce quality using green-light sensing.

Access my full list of publications at https://researchportal.helsinki.fi/fi/persons/agustin-zuniga

2.2. Research assessment and awards
   - Doctoral Thesis Prize 2023, University of Helsinki
   - Nokia Scholarship Award (2021), Nokia Foundation
   - Travel Grant (2019), DoCS, Faculty of Science, University of Helsinki.

2.3. Activities in the academic community
Conference and workshop organization and technical committees
   - **ACM MobiSys 2023:** 21st ACM International Conference on Mobile Systems, Applications, and Services – **Video Chair.**
   - **PerCrowd 2020:** 3rd International Workshop on Context-Awareness for Multi-Device Pervasive and Mobile Computing (in conjunction with PerCom 2020) – **Web Chair**.
   - **PerCrowd 2019:** 2nd International Workshop on Context-Awareness for Multi-Device Pervasive and Mobile Computing (in conjunction with PerCom 2019) – **Web Chair**.

Recognised reviewer
- Scientific Reports (Nature), ACM IMWUT, IEEE Open Journal of the Computer Society, Pervasive and Mobile Computing Journal (Elsevier), IEEE Internet of Things Journal, IEEE UIC, ACM ICDCN, ACM ITiCSE, IEEE PerCrowd@PerCom.

Conference and workshop presentations
- **Tartu-Helsinki Research Workshop on Pervasive Sustainability, 2022:** Topic: Ripe or Rotten? Low-Cost Produce Quality Estimation using Reflective Green Light Sensing.
- **Workshop on Autonomous Sensing Vehicles, 2022**: Toward Blue Skies: City-Scale Air Pollution Monitoring using UAVs.
- **UbiComp, 2021**: Paper: How Low Can You Go? Performance Trade-offs in Low-Resolution Thermal Sensors for Occupancy Detection: A Systematic Evaluation
- **The Web Conference, 2019**: Paper: Tortoise or Hare? Quantifying the Effects of Performance on Mobile App Retention.

2.4. Research collaborations
My research interests lie in the fields of pervasive data science (PDS) and artificial intelligence of things (AIoT). Over the years, I have had the privilege of collaborating with numerous prestigious researchers worldwide.

International collaborations: Professor Pan Hui from the Hong Kong University of Science and Technology in Guangzhou, with whom I have collaborated on data science-related topics. I have also collaborated with Professor Moustafa Youssef from the American University in Cairo in Egypt on sensing systems studies. Professor Sumi Helal of the University of Florida, USA, on research involving digital health. Associate Professor Huber Flores of the University of Tartu, Estonia, on topics related to sensing systems and mobile computing. Assistant Professor Marko Radeta of the University of Madeira, Portugal, for studies on marine ecosystems and sensing.

Local collaboration, Finland: Professor Petteri Nurmi, Leader of the Pervasive Data Science Group, University of Helsinki as my main supervisor. Professor Sasu Tarkoma, Dean of the Faculty of Science, University of Helsinki, on topics related to crowdsensing and networked systems. Dr Naser Hossein Motlagh, Senior Researcher, University of Helsinki, for research focused on environmental sensing and autonomous vehicles.

3. TEACHING AND SUPERVISION
3.1. Teaching philosophy and pedagogical training
My teaching philosophy is grounded in Constructivist Learning Theory to create dynamic learning environments. I prioritize student-centered approaches that facilitates meaningful learning through reflection and interaction. My goal is to cultivate interconnected learning ecosystems that enrich students' experiences and deepen their connection to the university community and society. My teaching training includes 30 ECTS credits in higher education pedagogy at the University of Helsinki, which included topics on assessment of learning, academic supervision, course design, challenges in education and internationalisation.

3.2. Experience in undergraduate and postgraduate teaching
Responsible/ Co-Responsible

2021 - Date	Faculty of Science, Department of Computer Science, University of Helsinki, Finland.
	Courses: Seminar on the Internet of Things (2024 and 2022: Together with Prof. Petteri Nurmi), Pervasive Data Science (2022: Together with Prof. Petteri Nurmi, 2023: Together with Prof. Petteri Nurmi and Dr. Ngoc Thi Nguyen).

2015 - 2016	Faculty of Mathematics and Technology, International University of Ecuador, Ecuador. **Course**: Formal Languages and Automata Theory (2015, 2016).
Teaching Assistant	
2019 - 2023	Faculty of Science, Department of Computer Science, University of Helsinki, Finland. **Courses:** Introduction to the Internet of Things (2019-2023), Pervasive Data Science (2020, 2021), Seminar on the Internet of Things (2021), Mobile Sensing (2019),

3.3. Development of online learning platforms

I collaborated with Professor Petteri Nurmi and Dr. Ngoc Thi Nguyen from the University of Helsinki as a co-creator of the Introduction of Internet of Things – MOOC. This contribution aims to facilitate the democratisation of education by making the knowledge accessible to students worldwide through online study material in topics related with IoT. The course currently has 600+ students enrolled on the platform. Access the platform at https://iot.mooc.fi.

3.4. Experience in supervision

I have supervised the completion of three undergraduate theses at two universities in Ecuador as an industrial supervisor. My responsibilities included guiding students in the formulation of their thesis ideas, validating their study and research methods, and assessing the successful achievement of objectives.

Bachelor students:
- Christian Zapata (Implementation of ES lifting system wells in the SCADA system of the CMCH. Universidad Tecnológica Equinoccial, UTE – Ecuador, 2016.)
- Jhonattan Borja (Implementation of Natural Gas Dehydrator facilities in the SCADA system of the CMCH. Armed Forces University, ESPE – Ecuador, 2016.)
- Diego Flores (Implementation of Liquefied Petroleum Gas storage facilities in the SCADA system of the CMCH. Armed Forces University, ESPE – Ecuador, 2015.)

4. PERSONAL REFERENCES

For further details about my qualifications, please contact my personal references, who are available to provide additional insights into my academic and professional background.

- **Petteri Nurmi, Professor**
  Department of Computer Science, University of Helsinki, Finland.
  Email: petteri.nurmi@helsinki.fi

- **George Roussos, Professor**
  Mobile Computing and the Internet of Things Lab, Birkbeck College, University of London, UK
  Email: g.roussos@bbk.ac.uk

- **Huber Flores, Associate Professor**
  Institute of Computer Science, University of Tartu, Estonia.
  Email: huber.flores@ut.ee

- **Pan Hui, Chair Professor & Nokia Chair in Data Science**
  HKUST-DT Systems and Media Laboratory (SyMLab), Hong Kong University of Science and Technology, Guangzhou.
  Email: panhui@cse.ust.hk