

# Christian Cabrera

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📄 <https://cabrerac.github.io/>

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I am a research associate in the ML@CL group at the Department of Computer Science and Technology of the University of Cambridge. I received a Ph.D. degree in Computer Science from Trinity College Dublin in 2020. My current research addresses the problems and challenges arising from deploying Artificial Intelligence systems in the real world. I am investigating the intersection between AI, systems, and software engineering to develop novel approaches for designing, building, monitoring, and adapting real-world AI-based systems. I am the author of more than 20 scientific papers published in top conferences and journals in the domains of Service-Oriented Computing, Pervasive Computing, and the Internet of Things.

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## Education

- June 2020 **Ph.D. in Computer Science**, Trinity College Dublin, Dublin, Ireland.  
Dissertation: *uDiscovery: An Urban-Centric Model for Service Discovery in Smart Cities*.  
Supervisor: Prof. Siobhán Clarke  
Research focus on the IoT service discovery and composition problems in large, dynamic, and distributed networks.
- September 2014 **M.Sc. in Systems and Computer Engineering**, Los Andes University, Bogotá, Colombia.  
Master's Dissertation: *MOWL: A Domain Specific Language for Handling Modular Ontologies*.  
Research focus on knowledge management to integrate multiple knowledge models.  
GPA: 4.37/5.0
- September 2011 **B.Sc. in Systems Engineering**, Universidad de Nariño, Pasto, Colombia.  
GPA: 4.06/5.0

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## Experience

- March 2021 **Research Associate**, Department of Computer Science and Technology, University of Cambridge, United Kingdom.  
Current  
Current research on the problem of deploying AI-based systems in the real world as part of the AutoAI project. Particularly, I am exploring and developing the *Data-Oriented Architectures* concept to enable the design and monitoring of AI-based systems. The ultimate goal of this research is to ensure AI-based systems perform robustly, safely, and accurately in their deployed environment.
- October 2021 **Teaching Assistant**, Department of Computer Science and Technology, University of Cambridge, United Kingdom.  
Current  
*Advanced Data Science*, Bachelors course: Designing the course material around the challenges data scientists face in reality. Supporting students' progress in laboratory sessions.
- May 2019 **Research Assistant (May 2019 - Jun 2020) - Research Fellow (Jun 2020 - Feb 2021)**, School of Computer Science and Statistics, Trinity College Dublin, Dublin, Ireland.  
February 2021  
Research on the provision of context-aware, pervasive and resilient applications in large and dynamic urban environments. Particularly, exploring the *self-adaptive organisation of services information* based on RL algorithms in smart cities, and the dynamic and proactive *service placement problem* at the edge based on meta-heuristic and prediction models.
- March 2015 **Teaching Assistant**, School of Computer Science and Statistics, Trinity College Dublin, Dublin, Ireland.  
February 2021  
*Advanced Software Engineering*, Master's course, *What is the Internet doing to me?*, TCD elective course, *Scalable Computing*, Master's course, *Systems Programming I*, 2nd year Bachelors course, and *Programming Project*, 1st year Bachelors course.

- August 2014 **Software Project Lead**, Conecta-TE, Los Andes University, Bogotá, Colombia.
- December 2014 Work on analysis, design and development of software to support educational processes.
- February 2012 **Research Graduate Assistant**, Systems Engineering Department, Los Andes University, Bogotá, Colombia.
- July 2014 Research on the semantic web, learning objects, and mobile learning.  
Master's thesis. Design and implementation of a domain-specific language to handle modular ontologies.
- February 2011 **Software Developer**, CJT&T Software Engineering, Pasto, Colombia.
- December 2011 Work on analysis, design and development of software.

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## Awards, and Scholarships

### Awards

- November 2018 **Ph.D. Final Year Trinity Employability Award**, in partnership with Intel. Dublin, Ireland.
- November 2011 **Best B.Sc. Research Final Project**, Universidad de Nariño, Pasto, Colombia.

### Scholarships

- March 2015 **Ph.D. research studentship in Dynamic Service Adaptation, Science Foundation Ireland**, Dublin, Ireland.

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## Supervision

### Undergrad Students

- June 2019 **Elizabeth Rojas**, Universidad de Nariño, Colombia.
- December 2019 Thesis topic: *Decision-making support tools for urban planners and authorities.*

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## Service to the Scientific Community

### Roles in Academic Journals

- Current **Reviewer for international peer-reviewed journals**, *IEEE Transactions on Services Computing (TSC)*, and *IEEE Internet of Things Journal*.
- 2022 **Co-organiser**, [Challenges in Deploying and Monitoring Machine Learning Systems](#), NeurIPS Virtual Workshop.
- 2022 **Co-organiser**, [NeurIPS at Cambridge Meetup](#), NeurIPS Satellite Event.
- 2022 **Co-organiser**, [ATI AI Fellows day at Cambridge](#).
- 2020-2021 **PC Member**, *International Joint Conference on Autonomous Agents and Multi-agent Systems (AAMAS)*.

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## Publications

### Peer-Reviewed Journals

- J5 **Cabrera C.**, Svorobej S., Palade A., Kazmi A., Clarke S., [MAACO: A Dynamic Service Placement Model for Smart Cities](#). *IEEE Transactions on Services Computing (TSC)*, IEEE, 2023.
- J4 **Cabrera C.**, Clarke S., [A self-adaptive service discovery model for smart cities](#). *IEEE Transactions on Services Computing (TSC)*, Vol. 15, No. 1, pp. 386-399, IEEE 2022.
- J3 Tabatabaee H., Rasool S., Kazmi A., Palade A., **Cabrera C.**, White G., Clarke S., [Dynamic Service Placement in Multi-access Edge Computing: a Systematic Literature Review](#). *IEEE Access*, Vol. 10, pp. 32639-32688, IEEE 2022.

- J2 Rojas E., Bastidas V., **Cabrera C.**, [Cities-Board: A Framework to Automate the Development of Smart Cities Dashboards](#). *IEEE Internet of Things Journal*, Vol. 7, pp. 10128-10136, IEEE 2020.
- J1 Palade A., **Cabrera C.**, Li F., White G., Razzaque MA., Clarke S., [Middleware for internet of things: an evaluation in a small-scale IoT environment](#). *Journal of Reliable Intelligent Environments*, Vol. 4, pp. 3-23, SpringerLink 2018.

### Peer-Reviewed Conference Proceedings

- C17 Cardozo N., Dusparic I., **Cabrera C.**, [Prevalence of Code Smells in Reinforcement Learning Projects](#). *Proceedings of the 2nd International Conference on AI Engineering: Software Engineering for AI*, 2023.
- C16 Paleyes A., **Cabrera C.**, Lawrence N., [An Empirical Evaluation of Flow Based Programming in the Machine Learning Deployment Context](#). *Proceedings of the 1st International Conference on AI Engineering: Software Engineering for AI*, 2022.
- C15 Paleyes A., **Cabrera C.**, Lawrence N., [Towards Better Data Discovery and Collection with Flow-Based Programming](#). *Neurips Data-Centric AI Workshop (DCAI)*, 2021.
- C14 **Cabrera C.**, Clarke S., [A Reinforcement Learning-Based Service Model for the Internet of Things](#). *International Conference on Service-Oriented Computing (ICSOC)*, pp. 790-799, SpringerLink 2021.
- C13 Palade A., Mukhopadhyay A., Kazmi A., **Cabrera C.**, Nomayo E., Iosifidis G., Ruffini M., Clarke S., [A Swarm-based Approach for Function Placement in Federated Edges](#). *IEEE International Conference on Services Computing (SCC)*, IEEE 2020.
- C12 **Cabrera C.**, Palade A., White G., Clarke S., [An Urban-driven Service Request Management Model](#). *IEEE International Conference on Pervasive Computing and Communications (PerCom)*, IEEE (2020).
- C11 Li F., **Cabrera C.**, Clarke S., [A WS-Agreement Based SLA Ontology for IoT Services](#). *International Conference on Internet of Things*, pp. 58-72, SpringerLink 2019.
- C10 White G., Palade A., **Cabrera C.**, Clarke S., [Autoencoders for QoS Prediction at the Edge](#). *IEEE International Conference on Pervasive Computing and Communications (PerCom)*, IEEE 2019.
- C9 **Cabrera C.**, Palade A., White G., Clarke S., [Services in IoT: A Service Planning Model based on Consumer Feedback](#). *International Conference on Service-Oriented Computing (ICSOC)*, pp. 304-313, SpringerLink 2018.
- C8 Palade A., **Cabrera C.**, White G., Clarke S., [Stigmergic Service Composition and Adaptation in Mobile Environments](#). *International Conference on Service-Oriented Computing (ICSOC)*, pp. 618-633 SpringerLink 2018.
- C7 White G., **Cabrera C.**, Palade A., Clarke S., [Augmented Reality in IoT](#). *Workshop on Context-Aware and IoT Services (CloTS) in the International Conference on Service-Oriented Computing (ICSOC)*, pp. 149-160, SpringerLink 2018.
- C6 **Cabrera C.**, Palade A., White G., Clarke S., [The Right Service at the Right Place: A Service Model for Smart Cities](#). *IEEE International Conference on Pervasive Computing and Communications (PerCom)*, IEEE 2018.
- C5 White G., Palade A., **Cabrera C.**, Clarke S., [IoTpredict: Collaborative QoS Prediction in IoT](#). *IEEE International Conference on Pervasive Computing and Communications (PerCom)*, IEEE 2018.
- C4 White G., Palade A., **Cabrera C.**, Clarke S., [Quantitative Evaluation of QoS Prediction in IoT](#). *47th Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN-W 2017)*, IEEE 2017.

- C3 **Cabrera C.**, Li F., Nallur V., Palade A., White G., Razzaque MA., Clarke S., [Implementing heterogeneous, autonomous, and resilient services in IoT: an experience report](#). *IEEE 18th International Symposium on A World of Wireless, Mobile and Multimedia Networks (WoWMoM)*, IEEE 2017.
- C2 Palade A., **Cabrera C.**, White G., Razzaque MA., Clarke S., [Middleware for Internet of Things: A quantitative evaluation in small scale](#). *IEEE 18th International Symposium on A World of Wireless, Mobile and Multimedia Networks (WoWMoM)*, IEEE 2017.
- C1 **Cabrera C.**, Palade A., Clarke S., [An evaluation of service discovery protocols in the internet of things](#). *17th Proceedings of the Symposium on Applied Computing (SAC)*, pp. 469-476, ACM 2017.

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## References

- Current supervisor **Prof. Neil Lawrence**, *DeepMind Professor of Machine Learning at University of Cambridge*, Department of Computer Science and Technology, University of Cambridge, William Gates Building, 15 JJ Thomson Avenue, Cambridge.  
Email: [ndl21@cam.ac.uk](mailto:ndl21@cam.ac.uk)
- Current supervisor **Dr. Carl Henrik Ek**, *Associate Professor at University of Cambridge*, Department of Computer Science and Technology, University of Cambridge, William Gates Building, 15 JJ Thomson Avenue, Cambridge.  
Email: [che29@cam.ac.uk](mailto:che29@cam.ac.uk)
- Ph.D. Thesis supervisor **Prof. Siobhán Clarke**, *Professor at Trinity College Dublin*, School of Computer Science and Statistics, College Green, Dublin 2, Ireland.  
Email: [Siobhan.Clarke@scss.tcd.ie](mailto:Siobhan.Clarke@scss.tcd.ie)