

# Aitor Azemar, PhD.

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Mathematical researcher with industry experience in power modelling, software development and data analysis.

## Employment

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                        |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Current<br>Jul 2025   | <b>Data Scientist</b><br>Developing BESS backcasts and Day ahead forecasts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lane Clark and Peacock |
| June 2025<br>Jul 2024 | <b>Energy Modelling Analyst</b><br>Developing the central battery dispatch model within the company, driving the predictions for long term battery revenues across Aurora's regional products. <ul style="list-style-type: none"><li>• Developed software for predicting battery revenue through fundamental and statistic approaches.</li><li>• Created and refined automated traders, optimizing revenue for a simulated battery energy storage system.</li><li>• Managed small teams of up to 2 other developers.</li><li>• Led the first cross regional release of the modelling product, managing the requirements of around 20 stakeholders.</li><li>• Reformulated the automated tests suite to be aligned with the company expansion targets.</li><li>• Adapted the central battery dispatch model to the German and Japanese electricity markets.</li><li>• <b>Python</b>, <b>Git</b> and <b>Agile</b> methodologies.</li></ul> | Aurora Energy Research |
| Jul 2024<br>Sep 2019  | <b>University lecturer</b><br>Lecturer position held part time during the Ph.D. <ul style="list-style-type: none"><li>• Lectured theory classes to cohorts of up to 200 students.</li><li>• Developed lecture material, including including course notes, problem sheets, exams and automated assignments.</li><li>• Tutored problem solving sessions for smaller groups of around 20 students.</li><li>• Ensured inclusivity requirements are satisfied, making sure individual students needs where met.</li><li>• <b>Maxima</b> and <b>STACK</b>.</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | University of Glasgow  |
| Aug 2019<br>Dec 2018  | <b>Gaming Mathematician</b><br>Mathematician in the design team of the videobingo division. <ul style="list-style-type: none"><li>• Redesigned internal mathematics to comply with more restrictive regulation, allowing expansion to the USA.</li><li>• Modelled player behaviour to simulate machine use, increasing accuracy of revenue predictions.</li><li>• <b>R</b>, <b>Java</b>, <b>Git</b> and <b>Agile</b> methodologies.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IGT                    |
| Dec 2018<br>Aug 2018  | <b>Junior Software Engineer</b><br>Entry level programming position, coded data treatment applications for a bank.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Better Consultants     |
| Apr 2018<br>Oct 2017  | <b>Teaching Assistant</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Universität Bonn       |

## Education

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|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| 2024 | <b>Ph.D. in Mathematics</b><br>Supervised by Maxime Fortier Bourque and Vaibhav Gadre<br><br>Studied the behaviour of random walks on networks and other geometric objects. Most of the work focused on theoretical aspects, where I managed to make significant advancements towards solving the main conjecture within my field.<br>Awarded <b>best Mathematics PhD of the year</b> by the school. | University of Glasgow             |
| 2018 | <b>M.Sc. in Mathematics</b><br>Supervised by Ursula Hamenstädt<br>1.1/1 - Awarded the maximum <b>ausgezeichnet</b> grade.                                                                                                                                                                                                                                                                            | Universität Bonn                  |
| 2016 | <b>B.Sc. in Mathematics</b><br>9.46/10 - Awarded <b>best Bachelor degree of the year in Mathematics</b> by the school.                                                                                                                                                                                                                                                                               | Universitat Autònoma de Barcelona |

## Selected publications

- *Network efficiency under nonconservative diffusion* (with Ernesto Estrada), **SIAM Journal on Applied Dynamical Systems**.  
Modelled the spread of information through complex networks using an agent based approach. We defined a new efficiency measure based on this spread of information, and applied it to study the brain network.
- *Mathematical modelling of a silicon carbide (SiC) pilot furnace* (with Charles Egan, James Andrews, Atrayee Bhattacharya, Andrew Lacey, Brady Metherall, and Nicholas Ryan), **MIIR**.  
A continuous, 1-dimensional modelling of a novel method of fabricating silicon carbide, which could potentially reduce carbon dioxide emitted during its production by a factor of 3.
- *Stationary measures on the circle from hyperbolic surfaces with cusps cannot be straightened by quasi-symmetries* (with Vaibhav Gadre), **preprint**.  
Combining techniques of functional analysis and Teichmüller geometry we solve a question posed by Field medallist McMullen, making a significant advance towards fully solving the singularity conjecture.
- *A qualitative description of the horoboundary of the Teichmüller metric*, **Algebraic & Geometric Topology**.  
Using a mix of geometric and analytical approaches, we determine several structural and stochastic properties of the horoboundary of Teichmüller space. With this, we get a series of first results on a previously unknown object, close a question by Liu–Su, simplify proofs on related topics, and open new avenues of research.

A full list of academic achievements, containing 2 industry collaborations, 8 academic publications and 7 presentations, can be found at [Aitor.Azemar.xyz](https://Aitor.Azemar.xyz)

## Awards

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|------|------------------------------------------------------------------------------|---------------------------------------|
| 2024 | William Jack prize for the best PhD of the year in the Mathematical Sciences | University of Glasgow (UofG)          |
| 2024 | Jon Nimmo Prize for teaching excellence                                      | University of Glasgow (UofG)          |
| 2016 | Emmy Noether prize for the best Bachelor Thesis of the year in Mathematics   | Catalan society of Mathematics (SCM)  |
| 2012 | Bronze Medal                                                                 | International Physics Olympiad (IPhO) |
| 2012 | Golden Medal                                                                 | Spanish Physics Olympiad (RSEF)       |
| 2012 | Bronze Medal                                                                 | Spanish Mathematics Olympiad (RSEM)   |