

# VICTORIA SÁNCHEZ MUÑOZ

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NOTE: the University of Galway, shorten as UoGalway, was formerly known as the National University of Ireland Galway.

## EDUCATION

### PhD Student

University of Galway

Oct 2019 – Ongoing Galway, Ireland

- PhD funded by the College of Science at UoGalway
- Affiliated with the School of Mathematical and Statistical Sciences
- Supervisor: Dr. Michael Mc Gettrick
- Title: "Boolean games played in a triangle using bi-partite and tri-partite entanglement"
- Modules taken (worth 5 ECTS): *Cryptography; Algebraic Foundations of Quantum Computing; Supporting Learning in Mathematics; and Scientific Programming Concepts; Intensive Writing Workshop.*

### Master's Degree in Theoretical Physics

Universidad Autónoma de Madrid

Sep 2016 – Sep 2017 Madrid, Spain

- Thesis title: "Entanglement and Geometry"
- Supervisor: Prof. José Luis Fernández-Barbón
- GPA: 7.62 / 10

### Bachelor's Degree in Physics

Universitat de València

Sep 2012 – Jul 2016 Valencia, Spain

- Thesis title: "The subtleties of Quantum Physics in the Mach-Zehnder interferometer"
- Supervisor: Prof. Vicente Giménez Gómez
- GPA: 8.75 / 10

## LANGUAGES

Spanish

Native



Catalan

Native



English

(April 2019) Cambridge English Advanced (CAE), Grade A.  
Overall score: 200/210.



German

(June 2023) Goethe-Zertifikat B1. Lesen: 99% , Hören: 93%, Schreiben: 100%, Sprechen 94%.



## WORK EXPERIENCE

### Teaching Assistant

University of Galway

Sep 2019 – ongoing Galway, Ireland

- Teaching assistant within the School of Mathematical and Statistical Sciences for:
  - SUMS (Support for Undergraduate Mathematics and Statistics) → Award for my work (see award section)
  - Tutor of modules: Linear Algebra, Engineering Mechanics.
- Tutoring support for a student with disabilities at *ServiSource - Education Support*
- **Lecturer** for the Access Centre at UoGalway. *Lecturing and exam preparation during March 2023 for a math module offered by the Access Centre, which offers programs to student with disabilities and mature students.*

### English-Spanish Translator

2018-2019-2020

El Pinós (Alicante), Spain

Occasional translator of English-Spanish. One of the most relevant translation job was translating documents in a court case.

### Junior Consultant

Better Consultants

Sep 2017 - Jul 2018

Barcelona, Spain

Programmer in several projects; the main one was the implementation of the MiFID II directive in AndBank Luxembourg. Used COBOL and SQL.

### Intern

GSI Helmholtzzentrum für Schwerionenforschung

Jul 2016 - Sep 2017

Darmstadt, Germany

- *International Summer Student Program at GSI-FAIR 2016, Research for Undergraduates.*
  - Worked at the FRS Ion Catcher at GSI performing data analysis to search for new exotic isomers using the specialised MAC program.
  - Advisor: Dr. Timo Dickel

### Tennis Instructor

Tennis Club

Summers '14-'15-'19-'20'

El Pinós (Alicante), Spain

Instructor for children between 5 and 14 by teaching them racket sports such as tennis, paddle, raquetball and ping-pong.

# SELECTED TALKS AND PUBLICATIONS

## Presentation

### Des journées quantiques à AMU

📅 21st Sep 2023 📍 Marseille, France

Presentation at the conference, held at the Centre International de Rencontres Mathématiques (CIRM).

## Poster

### Theory of Quantum Communication, Computing and Cryptography 2023

📅 24-28th Jul 2023 📍 Aveiro, Portugal

Poster contribution.

## Presentation

### Early Career Mathematicians Seminar Series

📅 13th July 2023 📍 (Online), the UK

Talk about the article [1], winner of the Graham Hoare Prize 2022 (see award section). Available at <https://www.youtube.com/watch?v=eZg3yOA1JwU>

## Presentation & Poster

### All-Island Quantum Festival at UCD

📅 29-30th Sep 2022 📍 Dublin, Ireland

Presentation and poster contribution.

## Presentation

### SIAM Annual Meeting 2022

📅 11-15th July 2022 📍 Pittsburgh, US

Representative of the SIAM Student Chapter at UoGalway. Contributed with a presentation about [2].

## Presentation & Poster

### 20-24th Conference of the International Linear Algebra Society

📅 24th June 2022 📍 Galway, Ireland

Presentation and poster contribution in the mini-symposium section "Mathematics of quantum information".

## Presentation

### 8th European Congress of Mathematics

📅 20-26th June 2021 📍 (Online) Portorož, Slovenia

Online presentation on the research in [2] in the mini-symposium section "Probability - A game theory and its applications" (MS - ID 56).

## Articles

- [1] V. Sánchez Muñoz, "The estimation of wind speed: Challenging the insurance company's decision," *Mathematics Today*, Dec. 2022, Winner of the Graham Hoare Prize 2022. [Online]. Available: <https://ima.org.uk/20878/the-estimation-of-wind-speed-challenging-the-insurance-companys-decision/>.
- [2] V. Sánchez Muñoz and M. Mc Gettrick, "Nash equilibria in certain two-choice multi-player games played on the ladder graph," *International Game Theory Review*, vol. 23, no. 03, Jan. 2021. DOI: <https://doi.org/10.1142/S0219198920500206>. [Online]. Available: <https://arxiv.org/abs/2101.09103>.

# GRANTS AND AWARDS

## Junior Research Fellowship

by: Erwin Schrödinger International Institute for Mathematics and Physics (ESI)

📅 May-June 2024 📍 Vienna, Austria

Junior Research Fellowship <https://www.esi.ac.at/events/jrf> for 2 months to work with Dr. Borivoje Dakic at University of Vienna (Austria).

## Hackathon personal invitation

by: Horizon Quantum

📅 Nov 2023 📍 Bali, Indonesia

Personally invited by the company Horizon Quantum <https://www.horizonquantum.com/> to participate in a Hackathon from 27th Nov - 2nd Dec 2023 in Bali (Indonesia). Our team won one honoray prize worth \$ 5000.

## UK and Ireland Mathematics and Statistics Support Networks awards for Excellence

by: Sigma Network

📅 Sep 2023 📍 UK and Ireland

One of the five winners of the awards for an excellent support in maths and statistics <https://www.sigma-network.ac.uk/awards/>.

## 10th Heidelberg Laureate Forum

funder: Heidelberg Laureate Forum Foundation

📅 Sep 2023 📍 Heidelberg, Germany

Selected to attend the 10th Heidelberg Laureate Forum, which brings together the recipients of the most prestigious awards in mathematics and computer science and 200 selected young researchers. I was interviewed for it <https://scilogs.spektrum.de/hlf/hlf-spotlight-10th-hlf/>. I contributed with a poster, a 2-minute presentation <https://www.youtube.com/watch?v=OmtgvQ11TOE>, and a drawing for the intercultural project. I also received an Abbe Grant to cover all costs related to the forum, issued from the Carl-Zeiss-Stiftung foundation, given only to 30 young researchers.

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## **Graham Hoare Prize 2022**

by: **Institute of Mathematics and its Applications (IMA)**

 Dec 2022

 UK


My article [1] won the Graham Hoare Prize 2022, awarded annually to Early Career Mathematicians by the IMA for "a brilliant Mathematics Today article".

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## **High-level Mobility Grant**

funder: **French Embassy in Ireland and Campus France**

 May 2022

 Paris, France

1-month mobility grant to work with Dr. Damian Markham at his group LIP6 at Sorbonne Université (Paris, France).

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## **European Kovalevskaya Travel Grant**

funder: **Deutsche Mathematiker-Vereinigung and European Mathematical Society**

 Dec 2021


 St. Petersburg, Russia

Travel grant to attend the International Congress of Mathematics (ICM) 2022 in St. Petersburg, Russia, in July 2022. *The travel grant was cancelled because the ICM 22 was moved online due to the Russian invasion of Ukraine.*

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## **PhD Scholarship**

funder: **College of Science at University of Galway**

 Oct 2019-2023

 Galway, Ireland

Fully-funded PhD scholarship at the School of Mathematical and Statistical Sciences at UoGalway (Ireland).

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## **International Summer Student Program at GSI, Research for Undergraduates**

funder: **GSI Helmholtzzentrum für Schwerionenforschung**

 Jul-Sep 2016

 Darmstadt, Germany

Scholarship to participate in the two-month International Summer Student Program at GSI-FAIR 2016, Research for Undergraduates.

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## **OUTREACH**

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  **Seminar on quantum games** (Dec '23, Jan '24)

Invited by QWorld to give two seminars during the QJam2024 "Making Quantum Games" <https://qworld.net/qjam2024/> from my experience designing and developing a workshop on the Quantum Tic-Tac-Toe (see details below). Talk available at <https://www.youtube.com/watch?v=NoVaPcdwnVk>.

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 **Documentary + poster** (12th May 2023)

For the International Day of Women in Mathematics a professor and I organised a screening of the documentary "Secrets of the Surface: The Mathematical Vision

of Maryam Mirzakhani" at UoGalway and also made a poster about her.

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  **Workshop on Quantum Tic-Tac-Toe** (Apr 2022/23)

Full development of a 1-hour workshop based on my own programmed version of the game Quantum Tic-Tac-Toe\*. It is intended to illustrate some concepts of quantum physics to children between 10-12 years old. I have conducted 9 workshops in schools in Galway. Game available at <https://vickynititi.itch.io/quantum-tic-tac-toe>. \*The game is based on a paper by Allan Goff in 2006 <https://doi.org/10.1119/1.2213635>

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 **Talk for Maths Soc** (22nd Feb 2023)

Outreach talk "EA PD Sports - it's in the (quantum) game" for Maths Society at UoGalway.

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 **Threes at University of Galway** (15th Nov 2022)

Applicant to Threes 2022 at UoGalway with talk "to quantum or not to quantum". UoGalway's Threes is a research communications training programme and competition. The participants must present their research in 3 minutes with 3 slides.

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 **Bright Club Ireland Galway** (20th Oct 2022)

10-minute math-related monologue for Bright Club Ireland Galway during Maths Week. [https://www.youtube.com/watch?v=wAA5\\_F5yHqw](https://www.youtube.com/watch?v=wAA5_F5yHqw)

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 **Outreach talk at Universitat de València** (5th July 2022)


Outreach talk titled "The (quantum) game of life" at Escola d'Estiu Erasmus 2022 E3F (Summer Erasmus School) at the Physics Department at Universidad de València (Valencia, Spain). <https://www.youtube.com/watch?v=bHhC2yS7IHQ>

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 **Outreach talk for World Quantum Day 2022** (14th April 2022)

As a main coordinator of QIreland, organised and delivered a talk titled "Friendly introduction to quantum games" for World Quantum Day 2022. <https://www.youtube.com/watch?v=56TEfGvrKvI>

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 **Maths Enrichment Program at UoGalway** (2nd April 2022)

Contributor with a 2-hour online lecture on Geometry aimed at senior cycle students (16-17 years old).

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 **Outreach article at RTÉ Brainstorm** (Nov 2021)

Article "What has quantum computing got to do with my cybersecurity?" at RTÉ (Ireland's National Television and Radio Broadcaster) Brainstorm: <https://www.rte.ie/brainstorm/2021/1124/1262947-qquantum-computing-cybersecurity/>

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 **Outreach article at ResearchFeatures** (Oct 2021)

Outreach article about paper [2] on the website ResearchFeatures:

<https://researchfeatures.com/number-nash-equilibrium-certain-game/>

### **Online Quantum Game Jam** (30th Sep - 3rd Oct 2021)

Quantum physics expert in the Online Quantum Game Jam 2021. Our team developed an educational quantum game called "Heisenberg's Bicycle". The main game developer was Andy Dodson. Available in <https://itch.io/jam/online-quantum-game-jam/rate/1219967>.

### **FameLab Ireland Galway Heat 2021** (May 2021)

Application to FameLab Ireland 2021 in the Galway Heat: <https://www.youtube.com/watch?v=OTSfeUfdt5s&list=P L5CGywsweU HJ7XbZfoODUo0RcVQhVjfHh&index=10>

### **Mini-workshop on Möbius strips** (Nov 2020)

Within the Outreach Committee at the School of Maths at UoGalway, we produced a video of a workshop of Möbius strips for the Galway Science & Technology Festival 2020: <https://www.youtube.com/watch?v=Kal3QNqiK80t=1s>

### **Educational YT channel** (Sep 2014 - Jul 2016)

Founder member of the Spanish educational YouTube channel "Tippe Top Physics" (now known as "Gas-trofísica"): <https://www.youtube.com/c/tippetopphysics/videos>

## WORKSHOPS

### **Race Equality Training** (22nd Nov 2023)

2-hour workshop about race equality. Organised by Human Resources at UoGalway.

### **Effective Presentation Skills** (21st Nov 2023)

7-hour workshop about presentation skills. Organised by the Research Development Centre at UoGalway.

### **Assertiveness Skills** (9th Nov 2023)

3-hour training to be more assertive. Organised by the Research Development Centre at UoGalway.

### **Growing Resilience** (9th Nov 2023)

3-hour training for PhD researchers to grow resilience. Organised by the Research Development Centre at UoGalway.

### **safeTALK** (13th Oct 2023)

3-hour training at UoGalway to identify and engage with persons who may be having suicidal thoughts.

### **First Point of Contact** (Apr - May 2023)

12-hour training at UoGalway to deal appropriately with a disclosure of sexual violence.

### **Disability Student Service Training** (5th Apr 2023)

2-hour training with the Disability Student Support Center at UoGalway on how to support students with disabilities.

### **Active Consent Workshop** (23th Jan 2023)

2-hour Workshop on Active Consent and eLearning module on "Sexual Violence and Harassment: How to Support Yourself and Your Peers", delivered by UoGalway.

### **Respect Workshop** (12th Dec 2022)

1.5-hour workshop at the School of Maths at UoGalway towards developing a respect charter in college.

### **Decarbonising Research Methods** (18th Nov 2022)

Half-day workshop organised at UoGalway.

### **#EndDeathByPowerPoint** (Oct 2022)

2-hour workshop about presentation skills organised at UoGalway and delivered by Dr. Echo Rivera, from Creative Research Communications.

### **Masterclass** (15-19th Aug 2022)

Masterclass about "The mathematics of quantum entanglement via nonlocal games" organised by the University of Copenhagen in Copenhagen (Denmark). The two keynote lecturers were Thomas Vidick and Vern I. Paulsen.

### **Podcasting your research** (26th Apr 2022)

1-hour workshop organised by the Research Development Centre at UoGalway.

### **How to stay well in research** (6th Apr 2020)

2-hour workshop organised by the Research Development Centre at UoGalway and delivered (online) by Hugh Kearns from IThinkWell.

### **Turbocharge your writing** (24th Jan 2020)

3-hour workshop organised by the Research Development Centre at UoGalway and delivered in-person by Hugh Kearns from IThinkWell.

## MEMBERSHIPS

### **SIAM** (Nov 2019 - ongoing)



Society for Industrial and Applied Mathematics (SIAM) Student Chapter at UoGalway. President during academic years 2021-2023.

### **Outreach Committee** (Dec 2019 - ongoing)


Postgraduate representative and member of the Outreach and Communication Committee at the School of Mathematical and Statistical Sciences at UoGalway.

 **University Women's Network at UoGalway** (Dec 2020 - ongoing)

 **Women in Quantum** (Mar 2021 - ongoing)

  **QIreland** (May 2021 - ongoing)


Co-founder and main coordinator of QIreland until September 2022. Regular member since. <https://qworld.net/qireland/>

 **IMA** (Sep 2021 - ongoing)

Institute of Mathematics and its Applications (IMA)

 **Open Scholarship** (Oct 2021 - ongoing)

Active member of the postgraduate community for Open Scholarship at UoGalway.

 **Alumnnode** (Oct 2023 - ongoing)

Network composed by alumni of a variety of programs and institutions, all funded by the Klaus-Tschira Stiftung. I joined after my participation at the 10th Heidelberg Laureate Forum in Sep 2023.

## OTHER SKILLS

 **Conference Organisation** (9th Dec 2022)

While president of the SIAM Student Chapter at UoGalway, we organised the 9th Annual Irish SIAM Student Chapter Conference <https://www.universityofgalway.ie/science-engineering/school-of-maths/societyforindustrialandappliedmathematicssiam/9thannualirishsiamstudentchapterconference/>.

 **Seminar Organisation** (Mar 2021 - May 2022)

Co-organiser of a weekly seminar for postgraduates at the School of Maths at UoGalway. <https://www.universityofgalway.ie/science-engineering/school-of-maths/seminars/postgraduateseminargroup/>

 **CPR course** (28th Jan 2022)

Completed the cognitive and skills evaluations in accordance with the curriculum of the American Heart Association Heartsaver CPR AED Program.

 **Digital badge** (May 2021)

General Data Protection Regulations (GDPR), issued by UoGalway.

 **Digital badge** (March 2020)

Mathematics Learning Support: Communication Skills, issued by the National Forum for the Enhancement of Teaching and Learning in Higher Education.

## COMPUTER SKILLS

**Mathematica** (advanced)

**Python** (advanced)

**LaTeX** (advanced)

**Matlab** (intermediate)

**C++** (intermediate)

**SQL** (intermediate)

**COBOL** (intermediate)

**AS/400** (intermediate)

## PERSONAL INTERESTS

**Reading** (mainly novels)

**Tennis**

**Squash**

**Fitness**

**Films and TV series**

**Piano**

**Learning languages** (German and French)