

Dr. Malena Orduna Alegria

📍 Lawrence, USA
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🐦 @_malena_
🌐 @malena-oa

Detail-oriented researcher with over 7 years of experience in water resources engineering and management. Skilled in translating complex scientific concepts into easily understood terms and innovative learning techniques. Highly organized, collaborative team worker with project management and excellent communication skills.

</> Software Skills

Text Editing

Office Suite ●●●●●●
Latex ●●●●○

Image Editing

Board Game Design ●●●●○
Adobe Suite ●●○○○

Programming and visualization

Excel ●●●●●●
Matlab ●●●○○○
Python ●●●○○○
R ●●○○○○
Tableau ●●○○○○

Water and GIS modelling

ArcGIS ●●●●○
CaSiMiR ●●●○○○
MODFLOW ●●○○○○

Agent-Based modelling

GAMA (JS) ●●●●○
Netlogo ●●○○○○
Cormas ●●○○○○

🗨 Languages

Spanish ●●●●●●
English ●●●●●●
German ●●○○○

⚙ Skills

- » Open-mindedness
- » Problem-solving
- » Time management
- » Financial analysis
- » Adaptability
- » Fast Learning
- » Creativity
- » Perseverance

📁 Work Experience

- Jan 2023 - *Kansas Geological Survey* | **Postdoctoral Researcher** | Lawrence, USA
» Lead the development of an open source Crop-Hydrological-Agent Modeling Platform (CHAMP) that couples groundwater models, crop models, and agent-based models to investigate interactions among humans and water resources in irrigated agricultural landscapes.
- Jun 2021 - *Technische Universität Dresden* | **Research Associate** | Dresden, Germany
Sep 2016
» Conception of resilient complex water networks.
» Agent-based modelling of socio-hydrology interactions in agriculture.
» Design of effective learning and data collection approaches through collaborative science.
» Teaching and supervision of bachelor and master students.
- Jul 2015 - *Lincoln Agritech* | **Water Resources Research Intern** | Hamilton, New Zealand
Apr 2015
» Testing of StreamGEM model for chemical analysis of groundwater in three different basins in New Zealand.
» Support of field work for research projects.
- Jul 2013 - *3M Mexico* | **Research and Development Engineer** | San Luis Potosí, México
Jan 2013
» Risk and environmental analysis for products of 3M Health Care Business.
» Development and research of new product ideas.
- Dec 2012 - *UASLP Metallurgy Institute* | **Water Treatment Engineer** | San Luis Potosí, México
Aug 2012
» Estimation arsenic and fluoride concentrations in drinking water quality.
» Design electro-dialysis water treatment to remove fluoride from wells and drinking water reservoirs located in San Luis Potosi, Mexico.

Teaching Experience

- Apr 2022 | *Technische Universität Dresden* | Dresden, Germany
» The Potential of Serious Games to Solve International Water Issues.
- Feb 2020 | *Goethe Universität* | Frankfurt, Germany
» Integrated water resources management, monitoring strategies and trans-boundary conflicts in practice.
- Oct 2019 | *Technische Universität München* | Munich, Germany
» Integrated water resource management in agriculture.
» Socio-hydrology dynamics and game theory.
- May 2019 | *Technische Universität Dresden* | Dresden, Germany
» Introduction to social dynamics in integrated water resources management.

Education

- Mar 2021 | *Technische Universität Dresden* | **Dr. Rer. Nat. in Socio-Hydrology** | Dresden, Germany
- Sep 2016 | » Development of inter- and trans-disciplinary approaches for sustainable water resources management.
» *Grade: magna cum laude*
- Aug 2017 | *Purdue University* | **PhD Research Stay** | Indiana, United States
- Mar 2017 | » Evaluation and estimation of evapotranspiration rates and prospective irrigation strategies in the U.S.
- Sep 2015 | *Universität Stuttgart* | **M.Sc. in Water Resources Engineering Management** | Stuttgart, Germany
- Oct 2013 | » Application and assessment a spatially lumped model for dynamic analysis of stream flow and water chemistry.
» *Grade: 2.4*
- May 2013 | *Universidad Autónoma de San Luis Potosí* | **Bachelor in Environmental Engineering** | San Luis Potosí, México
- Aug 2008 | » Prefeasibility study for water treatment by electro-dialysis for fluoride removal.
» *Grade: 9.3/10*
- Jul 2011 | *West Virginia University* | **B.Eng Study Abroad** | West Virginia, United States
- Aug 2010 | » Elements of environmental protection and resource economy.
- May 2007 | *Tecnológico de Monterrey* | **High School** | San Luis Potosí, México
- Aug 2004 | » Bicultural high school education with an international exchange program in Mount Royal College in Calgary, Canada

Certificates

- Apr 2022 | *Udemy - ZtM* | **Complete Python Developer in 2022** | online
» Python 3 developer: function and object oriented programming, machine learning, data science, automation using PyCharm, Git, and Jupyter Notebooks
- Mar 2022 | *Udemy - 365 Careers* | **The Data Visualization Course** | online
» Data visualization with Excel, Python, R and Tableau
- Aug 2018 | *ETH Zürich* | **Modeling and Simulating Social Systems with MATLAB** | Online
» Introduction to dynamical systems, networks and game theory and agent based modeling.
- Oct 2017 | *Technische Universität Dresden* | **Scientific Writing and Communication** | Dresden, Germany

» Basics of planing and writing different academic texts.

Feb 2017 | *Technische Universität Dresden* | **R Statistical Workshop** | Dresden, Germany
» Introduction to the statistics software R: Basic techniques, fundamental statistical methods and selected topics.

Summer Schools

Sep 2019 | *AGROPOLIS International* | **MISS-ABMS** | Montpellier, France
» Multi-platform agent-based modelling and simulation for renewable resources management.

Aug 2017 | *Technische Universität Dresden* | **International Synthesis Summerschool** | Dresden, Germany
» Basics of methods and tools for analysis of network functional dynamics.

Jun 2012 | *Universität Kassel* | **Hessen International Summer University** | Kassel, Germany
» Integrative Environmental Management and Engineering.
» Artistic Adaptation Strategies to Climate Change.

Awards and Scholarships

2019 Outstanding Student Presentation Award (**AGU Fall Meeting**)

2016 International Research Training Group Grant: Resilient Complex Water Networks (**Technische Universität Dresden**)

2013 CONACYT-DAAD Cooperation Programme Scholarship (**Universität Stuttgart**)

2010 PROMESAN Scholarship for Student Exchange Program for Higher Education in North America (**West Virginia University**)

Conferences

Dec 2019 **American Geoscience Union General Assembly**, San Francisco, United States
Orduña Alegría, M. E.; Schütze, N.; Al Khatri, A.; Mialyk O.; Grundmann J. *Assessing Impacts of Decision-Making Theories on Agrohydrological Networks Using Agent-Based Modelling.*
Orduña Alegría, M. E.; Schütze, N. *Understanding the socio-hydrological dynamics in agriculture using a serious board game.*

Oct 2019 **Water Security and Climate Change Conference**, San Luis Potosí, México
Orduña Alegría, M. E.; Monji, F.; Mozzi, G.; Schütze. *Towards understanding the socio-hydrological dynamics of irrigation in agriculture.*
Orduña Alegría, M. E.; Mialyk, O.; Schütze. *Optimization of crop water productivity and food security under limited water resources: interdisciplinary assessment of the prospective implementation of deficit irrigation strategies.*

Sep 2019 **IAH Groundwater Management and Governance Congress**, Malaga, Spain
Orduña Alegría, M. E.; Monji, F.; Mozzi, G.; Schütze. *An Agent Based Modelling approach to assess the impact of water demand in irrigation networks.*

- Aug 2019 **Scientific Area Network "Dynamics of Complex Networks"**, Dresden, Germany
Orduña Alegría, M. E.; Schütze, N. *Towards understanding the socio-hydrological dynamics of irrigation in agriculture.*
- Apr 2019 **European Geoscience Union General Assembly**, Vienna, Austria
Orduña Alegría, M. E.; Schütze, N.; Niyogi, D. *Hydroclimatic impacts in agriculture in the U.S.: an integrated assessment of the prospective implementation of deficit irrigation strategies.*
- Mar 2019 **Biopolis PhD Symposium**, Dresden, Germany
Orduña Alegría, M. E.; Monji, F.; Mozzi, G.; Schütze, N. *n Agent Based Modelling approach to assess the impact of water demand in irrigation networks.*

Publications

- 2021 Orduña Alegría, M. E. *Optimization of Agro-Socio-Hydrological Networks under Water Scarcity Conditions*. Dissertation. url: <https://tinyurl.com/Qucosa>
- 2020 Orduña Alegría, M. E.; Schütze, N.; Zipper, S. *A Serious Board Game to Analyze Socio-Ecological Dynamics towards Collaboration in Agriculture*. *Sustainability*, 12(13), 5301. doi: [10.3390/su12135301](https://doi.org/10.3390/su12135301)
- 2020 Orduña Alegría, M. E.; Schütze, N.; Al Khatri, A.; Mialyk O.; Grundmann J. *Assessing Impacts of Decision-Making Theories on Agrohydrological Networks Using Agent-Based Modelling*. *Earth and Space Science Open Archive*, 2019. Pre-print doi: [10.1002/essoar.10501893.1](https://doi.org/10.1002/essoar.10501893.1)
- 2019 Orduña Alegría, M. E.; Schütze, N.; Niyogi, D. *Evaluation of Hydroclimatic Variability and Prospective Irrigation Strategies in the U.S. Corn Belt*. *Water*, 11(2447):1-18. doi: [10.3390/w11122447](https://doi.org/10.3390/w11122447)
- 2015 Woodward, S.; Orduña Alegría, M. E.; Wöhling, T.; Stenger R. *Uncertainty of catchment nitrate flux estimates calculated using the "StreamGEM" approach with monthly monitoring data*. The New Zealand Hydrological Society Conference Proceedings. Hamilton, New Zealand. url: <https://tinyurl.com/NZHydro>

Developed Serious Board Games

- » **MAHIZ** - Role-playing board game designed to analyze climate change, policy implementations, and technological adaptations in agriculture.
- » **MoRe WATER** - Monitoring and Remediation of Waters: Role-playing and deception game about water quality monitoring in a trans-boundary river.

Outreach and Volunteering

- 2019, 2023 Games for Geoscience (**AGU** and **EGU**)
2022 *Interactive Game (World Water Week)*
- 2014 - 2015 Activity Coordinator (**IAHR BW YPN**)
- 2011 - 2012 Social Service (**UASLP - Environmental Agenda**)