MONIKA TWAROGOWSKA

Ph.D Applied Mathematics, M.Sc Applied Physics, M.Sc Mathematical Engineering

Contact: mtwarogowska@gmail.com +33(0)768130709
Homepage: https://monikatwarogowska.github.io/
Linkedin: https://www.linkedin.com/in/monikatwarogowska/

SUMMARY

- Multidisciplinary applied mathematician, who combines research skills, creativity and scientific knowledge and intuition, confirmed by 7 completed real-life projects aimed to understand complex mechanisms, discover patterns and design optimal strategies.

- Quick learner and problem solver with experience in programming, simulations and mathematical modeling. Together with project management and communication skills, verbal and written, these aspects have lead to >9 scientific publications, >20 presentations at conferences and various international collaborations.

- Curiosity, self-motivation an open mind reflect continuous development and exploration of new ideas by working autonomously as well as in multidisciplinary teams.

HIGHLIGHTS

- research and quantitative analysis
- modeling using advanced mathematical tools and stochastic methods
- calculus, numerical methods, programming, machine learning
- interdisciplinarity: mathematics, physics, biology, finance

- creative, organized and adaptable
- excellent communication skills across different audiences
- working independently and in cross-functional teams
- multilingual and open to diversity

WORK EXPERIENCE

University Research Scientist   2012 - 2018

- *École Normale Supérieur de Lyon, France*

    - Modeling knowledge and interdisciplinary perspective, demonstrated by integrating various cascading mechanisms, lead to an innovative model of pattern formation in developmental biology.

    - Logical and detail oriented approach together with solid coding skills, used in the development of Matlab algorithms, allowed for model simulations and analysis.

    - Persistence and creativity in parametrization and optimization resulted in simulations in agreement with experimental data.

    - Capability of clearly communicating complex topics to diverse audiences proven by 2 thematic conference presentations, biological and mathematical, and 2 publications.

- *University of L'Aquila, Italy*

    - Research and development of new numerical methods, showed in designing a new algorithm for kinetic models of mixed random - directed motion, enabled capturing characteristic behavior of bacteria E.Coli.

    - Knowledge of mathematical theory, including stability analysis, provided qualitative studies and new insights into (non-)uniqueness and (bi-)stability of solutions.

- *Centro Nationale di Ricerca - Rome, Italy*

    - Cross domain education and collaboration with multidisciplinary teams, while modeling and simulation of innovative biological experiments, resulted in 2 novel mathematical models of human cells development published in 2 international journals.

    - Patience and clarity in explaining complex topics, helped in effective communication with non-technical team members and in giving 4 advanced university courses, various open seminars on mathematics and supervising 2 master students.

- *INRIA Sophia-Antipolis, France*

    - Judging concepts and applicability of crowd dynamics models lead to advancing the state of the art of pedestrian modeling and optimization, while exploring novel strategies resulted in 2 publications on improvement of pedestrian evacuation by adding obstacles.

    - Programming skills, demonstrated by implementing pedestrian models solvers in C++, helped in the development of the multidisciplinary simulation platform num3sis.

INNOVATIONS AND DEVELOPMENTS

- 4 original predictive models applied to cells biology developed using advanced mathematical tools, such as pde/ode systems, hybrid modeling, stochastic methods, pattern structures and data analysis, to forecast and optimize complex behaviors.

- In-depth analysis - including parameter estimation, sensitivity analysis and benchmarking - to test and validate several mathematical models.

- 2 novel numerical algorithms using equilibrium analysis to simulate with higher accuracy pattern formation problems (given by non-linear pde systems).

- Simulations tools for technical and non-technical teams by implementing in Matlab various numerical methods.

- State of the art on current topics and support to the success of teams on strategic projects by research; collection, analysis and synthesis of information; and generation of new insights.

- 9 articles in international peer-reviewed journals, 14 presentations at international conferences, 6 university courses, >20 seminars and popularization lectures.

EDUCATION

- **Ph.D in Applied Mathematics** at University of L'Aquila, Italy   2008-2011

- Winner of Double Diploma (Italy-Poland) European program

- **M.Sc in Applied Physics** at Gdańsk University of Technology, Poland   2003-2008
- **M.Sc in Mathematical Engineering** at University of L'Aquila, Italy   2007-2008

- Professional development

  - **Machine Learning.** Completed on December, 2018 at coursera.org. Taught by Andrew Ng, Stanford University
  - **Financial theory.** Completed on December, 2018 at MITopenCourseware. Taught by Andrew Lo, Sloan School of Management (Massachusetts Institute of Technology)

SKILLS

- Knowledge: mathematics, physics, biology, finance, machine learning

- Technical skills: applied analysis, programming, research, modeling, simulation

- Code development: Matlab, num3sis, Git, Linux, html

- Word processing: Latex, Office

- Communication: writing, teaching, supervision, presentation, reviewing

LANGUAGES

	Written	Spoken	Reading
Polish	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
English	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
Italian	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
French	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
Spanish	●	● ●	● ●
Portuguese	●	●	● ●
German	●	●	●

HOBBY

- Learning new things: scientific, personal development, sport, meditation

- Reading: fantasy books, scientific journals, guides

- Outdoor: hiking, alpine climbing, cycling, traveling