Malgorzata Tyczynska Weh, MS, MSE (she/her)

Preferred name: Gosia Weh
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Ph.D. candidate, Cancer Evolution Lab
Department of Integrated Mathematical Oncology
Major PI: Dr. David Basanta
Co-PI: Dr. Andriy Marusyk

H. Lee Moffitt Cancer Center and Research Institute
University of South Florida &
12902 USF Magnolia Drive, SRB-4
Tampa, FL 33612

Education

Ph.D. Cancer Biology, major: Integrated Mathematical Oncology — Tampa, FL, USA
University of South Florida & Moffitt Cancer Center — *Aug. 2020 – current*

MS: Master of Mathematical Sciences (Dual-degree) — Daejeon, South Korea
KAIST: Korea Advanced Institute of Science and Technology — *Feb. 2016 – Jan. 2018*

MSE: Mathematical Modeling and Computation (Dual-degree — Kgs. Lyngby, Denmark
DTU: Technical University of Denmark — *Feb. 2016 – Jan. 2018*

Exchange Semester: Applied Mathematics — Corvallis, OR, USA
Oregon State University — *Jan. 2015 – Jun. 2015*

BSE: Mathematics and Technology — Kgs. Lyngby, Denmark
DTU: Technical University of Denmark — *Aug. 2012 – Jan. 2016*

Publications

2. Ikami K, Shoffner-Beck S, **Weh, M. T.**, Schnell S, Yoshida S, Diaz Miranda EA, Ko S, Lei L. *Branched germline cysts and female-specific cyst fragmentation facilitate oocyte determination in mice.* Proceedings of the National Academy of Sciences., 2023 May, DOI:10.1073/pnas.2219683120

1. Eilertsen, J., **Tyczynska, M. A.**, & Schnell, S. (2021). *Hunting ε: The origin and validity of quasi-steady-state reductions in enzyme kinetics*, SIAM J. App. Dyn. Syst., 2021, DOI: 10.1137/20M135073X

Funding proposals

Cancer Biology and Evolution (CBE) pilot grant — **FUNDED**
Oct. 2023

Title: Understanding the impact of therapy-induced plasticity on therapeutic responses to targeted therapies in lung cancers.

Principal Investigators:

- Dr. David Basanta (1%)
- Dr. Andriy Marusyk (1%)

Key personnel:

- Alicia Bjornberg (50%)
- **Malgorzata Tyczynska Weh** (50%)

Research awards

Featured Poster — Tampa, FL, USA
Moffitt Scientific Symposium — *May 2023*

Travel awards

Student Travel Award — Phoenix, AZ, USA
MathOnc23 Conference — *May 2023*

Student Travel Award — Ploen, Germany
Modelling Resistance Evolution Theoretical Methodology Symposium — *Apr. 2023*

Landahl Travel Award — Heidelberg, Germany
Society for Mathematical Biology Annual Meeting — *Sep. 2023*

Invited talks

Weh, M. T., Marusyk, A., Basanta, D. *Modeling selection for evolvability in the evolution of cancer therapy resistance*, Moffitt Scientific Symposium, Tampa, FL, USA, May 2023

Weh, M. T., Marusyk, A., Basanta, D. *Modeling selection for evolvability in the evolution of cancer therapy resistance* MathOnc23 Conference. Phoenix, AZ, USA, May 2023

Weh, M. T., Marusyk, A., Basanta, D. *Modeling selection for evolvability in the evolution of cancer therapy resistance* Modelling Resistance Evolution Theoretical Methodology Symposium, Max Planck Institute for Evolutionary Biology. Ploen, Germany, Apr. 2023

Tyczynska, M. A., Kim, J. K. *Detecting causal connections between neurons in Suprachiasmatic Nucleus* A3-NIMS joint workshop on interdisciplinary research connecting mathematics and biology. Daejeon, South Korea, May 2017

Poster presentations

Weh, M. T., Marusyk, A., Basanta D.. *Modeling selection for evolvability in the evolution of cancer therapy resistance.* Quantitative Science Division Meeting (Oktoberfest). H. Lee Moffitt Cancer Center & Research Institute, Tampa, FL, USA, Oct. 2023

Weh, M. T., Marusyk, A., Basanta D.. *Modeling selection for evolvability in the evolution of cancer therapy resistance.* Society of Mathematical Biology Annual Meeting. Ohio State University, Columbus, OH, USA, Jul. 2023

Weh, M. T., Marusyk, A., Basanta D.. *Modeling selection for evolvability in the evolution of cancer therapy resistance* **(Featured Poster)** Moffitt Scientific Symposium. H. Lee. Moffitt Cancer Center & Research Institute, Tampa, FL, USA, May 2023

Tyczynska, M. A., Marusyk, A., Basanta D.. *Modeling the impact of cancer treatment scheduling on the selection of evolvability leading to resistance.* Society of Mathematical Biology Annual Meeting. Heidelberg University, Heidelberg, Germany, Sep. 2022

Tyczynska, M. A., Marusyk, A., Basanta D.. *Mathematical model of the impact of cancer treatment scheduling on the selection of evolvability leading to resistance.* OTOWIM: On the Trail of Women in Mathematics. Gdansk University of Technology, Gdansk, Poland, Sep. 2022

Tyczynska, M. A., Marusyk, A., Basanta D.. *Understanding Evolution of Resistance to Targeted Therapies using Agent-Based Modeling* Moffitt Scientific Symposium. H. Lee. Moffitt Cancer Center & Research Institute, Tampa, FL, USA, May 2022

Research experience

Research Associate — Ann Arbor, MI, USA
University of Michigan Medical School — *Aug. 2018 - Jul. 2020*
Contact: Santiago Schnell (D.Phil), santiago.schnell@nd.edu

- Developed, analyzed, and evaluated a mathematical model for the autocatalytic enzyme reaction kinetics; designed the illustrations and wrote the manuscript together with Dr. Justin Eilertsen (published in SIAM)
- Collaborated on the development, analysis, and evaluation of statistical models for cyst fragmentation during oocyte and testis formation ((published in PNAS)
- Analyzed statistically 50k+ data entries from the SABIO-RK database to infer the reproducibility of biochemical constants inferred from the common enzyme kinetic assays.

Master thesis research — Daejeon, South Korea & Kgs. Lyngby, Denmark
KAIST & DTU — *Jan. 2017 - Jan. 2018*

Title: Detecting Causality in Oscillatory Systems
Contact: Dr. Jae Kyoung Kim, jaekkim@ibs.re.kr
Dr. Lasse Engbo Christiansen lsec@ssi.dk

Analyzed the applicability, accuracy, and sensitivity of mathematical algorithms to detect causality within oscillatory time series from 1) self-generated series of stochastic simulations of mammalian circadian rhythms and 2) neural activity recordings from the mammalian Suprachiasmatic Nucleus.

Bachelor thesis research — Kgs. Lyngby, Denmark
Technical University of Denmark — *Sep. 2015 - Dec. 2015*

Title: Modeling of Chemotaxis and Aggregation of Biological Cells
Contact: Dr. Mads Peter Soerensen

Developed, analyzed, implemented and simulated 2D PDE models for chemotaxis and aggregation of biological cells; a continuation from the OSU undergraduate project.

Undergraduate research project — Corvallis, Oregon
Technical University of Denmark — *Apr. 2015 - Jun. 2015*
Contact: Dr. Malgorzata Peszynska

Developed, analyzed, implemented and simulated 2D PDE models for chemotaxis of *staphylococcus aureus*

Mentoring Experience

Nandita Nair (w. Matthew Froid) — Tampa, FL, USA
Moffitt HIP IMO: high school internship program — *Jun. - Aug. 2023*

Teaching experience

Engineering Mathematics 2 (BSE level) — Ballerup, Denmark
DTU Compute, Technical University of Denmark — *Feb. 2016 - May 2016*

Mathematics and Technology (BSE level) — Kgs. Lyngby, Denmark
DTU Compute, Technical University of Denmark — *Sep. 2015 - Jan. 2016*

Engineering Mathematics 1 (BSE level) — Kgs. Lyngby, Denmark
DTU Compute, Technical University of Denmark — *Sep. 2014 - Dec. 2014*

Professional Service

Vice-President, Cancer Biology Student Organization (CBSO) Tampa, FL
USF & H. Lee Moffitt Cancer Center & Research Institute *Sep. 2022 - Aug. 2023*

Performed leadership and administrative tasks typical for the US student organization; participated in meetings with the leadership of the Cancer Biology program.

Secretary, Cancer Biology Student Organization Tampa, FL
USF & H. Lee Moffitt Cancer Center & Research Institute *Sep. 2021 - Aug. 2022*

Performed administrative tasks typical for the US student organization; participated in meetings with the leadership of the Cancer Biology program.

Student representative, Education Management Group Kgs. Lyngby, Denmark
Technical University of Denmark, DTU Compute Institute (webpage) *Sep. 2014 - Jun. 2018*

Represented student body at the DTU Compute administrative group to manage, analyze, and evaluate the quality of BSE and MSE education and the well-being of students.

Social tutoring Kgs. Lyngby, Denmark
Polyteknisk Forening (webpage) *Sep. 2013 - Jan. 2014*

Helped ten students to be accommodated at the DTU during their first year.

General representative, Software, Mathematics, and AI students council Kgs. Lyngby, Denmark
Polyteknisk Forening (webpage) *Jan. 2013 - Jan. 2018*

Participated in the monthly meetings to evaluate and improve the well-being of students at DTU Compute.

Programming languages

- **Java, R, MATLAB, Python, LaTeX**:
  Advanced - using on a daily basis.

Languages

- **English**: Full professional proficiency
  TOEFL ibt: 100/120 (from Nov. 2^{nd} 2018)
- **Polish**: Native proficiency
- **Danish**: Full professional proficiency
- **German**: Limited working proficiency