

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

Preferred name: Gosia Weh

Née: Malgorzata Anna Tyczynska

Malgorzata.Weher@moffitt.org

Webpage: gosiaweher.com

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

PUBLICATIONS

Weh, M.T., Pradella, D., Basanta D., Marusyk A, Ventura A. *The dual effect of ecDNA during tumor initiation and progression*[in preparation]

Kumar P., Vander Velde R., **Weh, M.T.**, Basanta D., Marusyk A. *Acceleration of drug metabolism mediated by CYP3A4 enzyme activation provides a bona fide environmental resistance mechanism to targeted therapies*[in preparation]

Weh, M.T., Kumar P., Marusyk V. Marusyk A., Basanta D., *The adaptive state determines the impact of mutations on evolving populations*(BioArxiv) DOI:10.1101/2024.12.11.627972

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

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

EDUCATION

Ph.D. Integrated Mathematical Oncology

USF: University of South Florida & Moffitt Cancer Center

Tampa, FL, USA

Aug. 2020 – current

MS: Master of Mathematical Sciences (Dual-degree)

KAIST: Korea Advanced Institute of Science and Technology

Daejeon, South Korea

Feb. 2016 – Jan. 2018

MSE: Mathematical Modeling and Computation (Dual-degree)

DTU: Technical University of Denmark

Kgs. Lyngby, Denmark

Feb. 2016 – Jan. 2018

Exchange Semester: Applied Mathematics

Oregon State University

Corvallis, OR, USA

Jan. 2015 – Jun. 2015

BSE: Mathematics and Technology

DTU: Technical University of Denmark

Kgs. Lyngby, Denmark

Aug. 2012 – Jan. 2016

INVITED TALKS

Weh, M. T., Kumar, P., Marusyk, A., Basanta, D. *The only constant is change: diversification in cancer and beyond*, Invited Seminar, MD Anderson, Houston, TX, USA, Dec. 2024

- Weh, M. T.**, Kumar, P., Marusyk, A., Basanta, D. *Cancer adaptation to treatment depends on the capacity to mutate*, Society of Mathematical Oncology Annual Meeting, Seoul, South Korea, July 2024
- Weh, M. T.**, Kumar, P., Marusyk, A., Basanta, D. *Understanding cancer through the lens of evolvability*, IMO research in progress, Tampa, FL, USA, June 2024
- 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
- Weh, M. T.**, Marusyk, A., Basanta, D. *Modeling evolvability during adaptation to treatment* IMO research in progress, Tampa, FL, USA, 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.**, Kumar, P., Marusyk, A., Basanta D.. *Adaptation to cancer treatment depends on the cells ability to mutate* Moffitt Scientific Symposium. H. Lee. Moffitt Cancer Center & Research Institute, Tampa, FL, USA, May 2024
- 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 AWARDS

Featured Poster
Moffitt Scientific Symposium

Tampa, FL, USA
May 2023

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%)

TRAVEL AWARDS

Cancer Biology Student Travel Award
Society for Mathematical Biology Annual Meeting

Seoul, South Korea
Sep. 2024

Student Travel Award
MathOnc23 Conference

Phoenix, AZ, USA
May 2023

Student Travel Award
Modelling Resistance Evolution Theoretical Methodology Symposium

Ploen, Germany
Apr. 2023

Landahl Travel Award
Society for Mathematical Biology Annual Meeting

Heidelberg, Germany
Sep. 2023

RESEARCH EXPERIENCE

Research Associate
University of Michigan Medical School

Ann Arbor, MI, USA
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
KAIST & DTU

Daejeon, South Korea & Kgs. Lyngby, Denmark
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
Technical University of Denmark

Kgs. Lyngby, 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
Technical University of Denmark

Corvallis, Oregon
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)
Moffitt HIP IMO: high school internship program

Tampa, FL, USA
Jun. - Aug. 2023

TEACHING EXPERIENCE

Engineering Mathematics 2 (BSE level)
DTU Compute, Technical University of Denmark

Ballerup, Denmark
Feb. 2016 - May 2016

Mathematics and Technology (BSE level)
DTU Compute, Technical University of Denmark

Kgs. Lyngby, Denmark
Sep. 2015 - Jan. 2016

Engineering Mathematics 1 (BSE level)
DTU Compute, Technical University of Denmark

Kgs. Lyngby, Denmark
Sep. 2014 - Dec. 2014

PROFESSIONAL SERVICE

Main organizer: Spatial ecology, evolution, and methods journal club
H. Lee Moffitt Cancer Center & Research Institute

Tampa, FL
May 2024 - current

Organized a multi-departmental and cross-disciplinary journal club to discuss scientific articles related to the inference & interpretation of spatial patterns in cancer and normal tissues, with the goal of understanding tumor ecology and evolution.

Vice-President, Cancer Biology Student Organization (CBSO)
USF & H. Lee Moffitt Cancer Center & Research Institute

Tampa, FL
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
USF & H. Lee Moffitt Cancer Center & Research Institute

Tampa, FL
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

Technical University of Denmark, DTU Compute Institute (webpage)

Kgs. Lyngby, Denmark

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

Polyteknisk Forening (webpage)

Kgs. Lyngby, Denmark

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

Polyteknisk Forening (webpage)

Kgs. Lyngby, Denmark

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, L^AT_EX:**
Advanced - using on a daily basis.

LANGUAGES

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