Matylda Ziętek, MSc

RESEARCH and MANAGEMENT experience

Genome Biology Unit, **EMBL**, Heidelberg, Germany — 2012 – present
Laboratory Officer in Charge, PI: Nassos Typas

Research Areas

- Rcs **signal transduction system** in *E.coli*:
  - Showed how outer membrane lipoprotein RcsF senses Bam machine and transduces signal to downstream components
  - Established cell shape as a novel que for the system and dissecting the impact of the system on cell division.

  Co-led a project, which involved molecular biology, biophysical and cell biology approaches, in an international collaboration between several labs.
- Role of cathepsin-dependent macrophage cell death during ***Salmonella*** **infection**. Performed infections assays and biochemical assays.

Also work on:

- Bacterial retrons as toxin/antitoxin systems. Created a systematic ORF library of P1 phage genome.
- Antibacterial drugs and antibacterial drugs combination.
- Bacterial periplasm protein-protein interaction.
- Transcription variability across the *E.coli* strain collection.

Lab Management and Research Support

- Assuring **smooth running lab** (organizing: lab duties, equipment care, space management, lab cleaning organization etc.).
- Initiating and supervising **inventory of lab recourses digitally**, which led to better supplies usage and money saving.
- Introducing new lab members to lab (operational procedures, equipment)
- Organize the yearly laboratory **retreat, often** in collaboration with other laboratories; includes 2 days of science collaboration and 1 day of team-building
- Safety supervisor. Managing **Biosafety Level 2** Lab for 8 years
- Teaching, providing **scientific advice** and **technical support** on lab member's projects. Support for undergraduates and post-docs leading to high impact factor publications.
- Provide **ongoing support** to 20 laboratory members enabling them to thrive and be part of the team. Facilitate the introduction of individuals to other group members that can help them with troubleshooting, minimize tensions.

zietek@EMBL.de • Hagenstrasse 3, 69-126 Heidelberg, Germany • 0491 759171946

Bioengineering, Microbiology & Immunology, **Stanford University**, Stanford, USA Oct 2013
Visiting Scientist, PI: KC Huang

- Working on collaborative project about Rcs system. Learning **live-cell imaging**.

Microbiology & Immunology, **UCSF**, San Francisco, USA 2009 – 2012
Staff Research Associate, PI: Carol Gross

- High-throughput **phenotyping** of *E.coli*. Working in close collaboration in 4-person team on high-content yielding screen. Mechanistical following up on screen hits: "Regulation of peptidoglycan synthesis by outer membrane protein", between others.

Bacterial Cell Biology Section, **Uni. of Amsterdam**, Amsterdam, Netherlands Dec 2009
Visiting Scientist, PI: Tanneke den Blaauwen

- Working on collaborative project about Rcs system. Learning **phase-contrast** and **fluorescent microscopy**.

Laboratory of Molecular Immunology, **PHRI,** Newark, USA 2005 -2008
Research Associate, PI: Yuri Bushkin

- The metalloproteinase-mediated pathway of soluble human **MHC class I** release. Studying the origin of soluble MHC class I molecules in **eukaryotic cell-lines**.

Laboratory of Cancer Genetics, **Polish Academy of Science**, Poznań, Poland 2003-2005
Research Associate, PI: WJ Krzyzosiak

- The trinucleotide polymorphism in human genes as the cause of genetic predisposition and pathomechanisms of neurological diseases. Uncovering natural, population variation of dynamic mutation by using polyacrylamide sequencing gels.

Methods

- Extended **microbiology** knowledge (11 years of experience in microbiology labs; *E.coli, Pseudomonas aeruginosa, Salmonella enterica* Typhimurium – physiology & genetics)
- Extended **molecular biology** methods (17 years of experience in molecular biology labs, qPCR, cloning and others)
- **Biochemical** methods (17 years of experience, protein purification and others)
- **High-throughput approaches** (robotics/automation, library preparation)
  Also work with:
  - **Cell line culture**
  - **Infection assays**
  - **Light microscopy (time-lapse, imnunofluoresence)**
  - **Cryo-EM**
  - **Image analysis (ImageJ)**
  - **Data analysis and visualization (MatLab / R)**

EDUCATION / SKILLS

Master Degree, Dept. of Gene Expression, A. Mickiewicz Univ. Poznań, Poland 2001-2003
PI: Zofia Szeweykoska-Kulinska, RNA editing in tRNA of *Pellia borealis*
Data presented in master degree thesis scored as very good and defense as excellent

Bachelor Degree, Dept. of Gene Expression, A. Mickiewicz Univ. Poznań, Poland 1998-2001
PI: Zofia Szeweykoska-Kulinska, RNA editing

Courses

- Introductory course on R programming, EMBL Heidelberg Course 2021
- Excel Advanced, FROG Software Training 2020
- **Cryo-EM and sample vitrification, EMBL** 2019
- Personal development and **management training**:
  Assert yourself with confidence and courage 2018
- Introduction to Python Programming, EMBL Heidelberg Course 2017
- **Illustrator** Beginners, GTD Heidelberg Course (Used in paper figures preparation/model visualization) 2015
- Introductory course on MATLAB programming, EMBL Heidelberg Course 2015
- Basic light microscopy course, EMBL Heidelberg Course 2013

Languages and Nationality
English (fluent, 15 years working in labs with English as a primary language),
Polish (fluent, native language), German (beginner); dual Polish-**American citizenship**

PUBLICATIONS/PRESENTATIONS

Oral Presentation

Zietek M, Miguel A, Sueki A, Maier L, Verheul J, Blaauwen T, Typas A, Huang KC.
The Rcs signal system regulates cell division.
EMBO workshop "Bacterial cell division: Closing the gap" June **2019**, Lund, Sweden

Poster Presentation

Zietek M, Miguel A, Sueki A, Maier L, Verheul J, Blaauwen T, Typas A, Huang KC.
The Rcs signal system regulates cell division.
SPP1617 International Conference "Phenotypic heterogeneity and sociobiology of bacterial populations", March **2019**, Hohenkammer, Germany
Zietek M, Maier L,Pesavento C, Verheul J, Miguel A, Ram S, Goulian M, Huang KC, Blaauwen T, Typas A.
Changes in cell shape as signal to regulate cell division by the Rcs signal transduction system in *E. coli.*
New Concepts & Approaches in Microbiology, EMBL Symposium **2015**, Heidelberg, Germany
Rozanska M, Sobczak K, Jasinska A, Napierala M, Kaczynska D, Czerny A, Koziel M, Kozlowski P, Olejniczak M, Krzyzosiak WJ.
CAG and CTG repeat polymorphism in exons of human genes shows distinct features at the expandable loci.
Annual Meeting of the Institute of Bioorganic Chemistry PAS. **2004** and **2005,** Poznan, Poland

Publications

Zietek M*, Miguel M*, Khusainov I, Asmar A, Ram S, Wartel M, Sueki A, Shi H, Pesavento C, Goulian M, Collet JF, Beck M, Huang KC, Typas A.
The Rcs envelope stress response is activated by increases in cell width.
About to be submitted in Plos Biol

Miguel A*, **Zietek M***, Shi H, Sueki A, Maier L, Pesavento C, Verheul J, Blaauwen T, Valen D, Typas A, Huang KC
Modulation of bacterial cell size and growth rate via activation of a cell envelope stress response.
About to be submitted in Plos Biol

Selkrig J, Li N, Hausmann A, Mangan MSJ, **Zietek M**, Mateus A, Bobonis J, Sueki A, Imamura H, El Debs B, Sigismondo G, Florea BI, Overkleeft HS, Kopitar-Jerala N, Turk B, Beltrao P, Savitski MM, Latz E, Hardt WD, Krijgsveld J, Typas A.
Spatiotemporal proteomics uncovers cathepsin-dependent macrophage cell death during Salmonella infection.
Nat Microbiol. 2020 Sep;5(9):1119-1133. doi: 10.1038/s41564-020-0736-7. Epub 2020 Jun 8. PMID: 32514074.

Brochado AR, Telzerow A, Bobonis J, Banzhaf M, Mateus A, Selkrig J, Huth E, Bassler S, Zamarreño Beas J, **Zietek M**, Ng N, Foerster S, Ezraty B, Py B, Barras F, Savitski MM, Bork P, Göttig S, Typas A.
Species-specific activity of antibacterial drug combinations.
Nature. 2018 Jul;559(7713):259-263. doi: 10.1038/s41586-018-0278-9. Epub 2018 Jul 4. PMID: 29973719; PMCID: PMC6219701.

Kritikos G, Banzhaf M, Herrera-Dominguez L, Koumoutsi A, Wartel M, **Zietek M**, Typas A.
A tool named Iris for versatile high-throughput phenotyping in microorganisms.
Nat Microbiol. 2017 Feb 17;2:17014. doi: 10.1038/nmicrobiol.2017.14. PMID: 28211844; PMCID: PMC5464397.

Cho SH, Szewczyk J, Pesavento C, **Zietek M**, Banzhaf M, Roszczenko P, Asmar A, Laloux G, Hov AK, Leverrier P, Van der Henst C, Vertommen D, Typas A, Collet JF.
Detecting envelope stress by monitoring β-barrel assembly.
Cell. 2014 Dec 18;159(7):1652-64. doi: 10.1016/j.cell.2014.11.045. PMID: 25525882.

Nichols RJ, Sen S, Choo YJ, Beltrao P, **Zietek M**, Chaba R, Lee S, Kazmierczak KM, Lee KJ, Wong A, Shales M, Lovett S, Winkler ME, Krogan NJ, Typas A, Gross CA.
Phenotypic landscape of a bacterial cell.
Cell. 2011 Jan 7;144(1):143-56. doi: 10.1016/j.cell.2010.11.052. Epub 2010 Dec 23. PMID: 21185072; PMCID: PMC3060659.

Typas A, Banzhaf M, van den Berg van Saparoea B, Verheul J, Biboy J, Nichols RJ, **Zietek M**, Beilharz K, Kannenberg K, von Rechenberg M, Breukink E, den Blaauwen T, Gross CA, Vollmer
Regulation of peptidoglycan synthesis by outer-membrane proteins.
Cell. 2010 Dec 23;143(7):1097-109. doi: 10.1016/j.cell.2010.11.038. PMID: 21183073; PMCID: PMC3060616.

Rozanska M, Sobczak K, Jasinska A, Napierala M, Kaczynska D, Czerny A, Koziel M, Kozlowski P, Olejniczak M, Krzyzosiak WJ.
CAG and CTG repeat polymorphism in exons of human genes shows distinct features at the expandable loci.
Hum Mutat. 2007 May;28(5):451-8. doi: 10.1002/humu.20466. PMID: 17226796.

REFERENCES CONTACT INFORMATION

Nassos Typas
Current Supervisor,
Group Leader and Senior Scientist, EMBL, Heidelberg, Germany
+49 6221 387-8156
athanasios.typas@embl.de

Lisa Maier
Past co-worker on **Rcs project**,
Independent junior research group leader Universität of Tübingen, Germany
+49 7071 29 80187
l.maier@uni-tuebingen.de

Joel Selkrig
Past co-worker on Proteomics of ***Salmonella*** **infected** macrophages project,
Scientist, EMBL, Heidelberg, Germany
+49 6221 387-8181
joel.pearson.selkrig@embl.de

KC Huang
Scientific Collaborator on **Rcs project**,
Professor of Bioengineering and Microbiology and Stanford University, USA
+1 650 721 2483
kchuang@stanford.edu

Tanneke den Blaauwen
Scientific Collaborator on **Rcs project**,
Faculty of Science, University of Amsterdam, Netherlands
+31 205 253 852
T.denBlaauwen@uva.nl

Carol Gross
Previous Supervisor,
Professor of Microbiology and Immunology, University of California, San Francisco, USA
Carol.Gross@ucsf.edu