

Ewa Niedzialkowska

Summary of qualifications:

- Over seven years of hands-on, bench-top research experience in structural biology and crystallography and three years of eukaryotic cell culture experience and fluorescence and TIRF microscopy techniques.
- Developed expertise in independent project management and in the design and execution of research strategies.
- Well-versed in molecular biology techniques, protein purification, crystallography, protein interaction assays, and fluorescence microscopy techniques.
- Strong interpersonal and mentorship skills. Participated in successful collaborations with researchers at UVA and other institutions. Trained students and delegated responsibilities.

Education

2014 PhD, biological sciences - biochemistry

Faculty of Biochemistry, Biophysics and Biotechnology, Jagiellonian University, Cracow, Poland
The influence of posttranslational modifications on interaction between histone H3 and Survivin
Thesis advisors: prof. Wladek Minor and prof. Todd Stukenberg

2009 MSc

Faculty of Biochemistry, Biophysics and Biotechnology, Jagiellonian University, Cracow, Poland
Heterogeneity of cancer cells: the influence of connexin 43 on the invasiveness of human prostate cancer cells DU145
Thesis advisors: prof. Jaroslaw Czyz

Experience

2022-current

University of Virginia, Research Scientist

Department of Biochemistry and Molecular Genetics
Structural characterization of filamentous proteins

Skills

Experimental techniques

Cryo-EM

2020 -2021

University of Virginia, postdoctoral research associate

Department of Biochemistry and Molecular Genetics
Development and optimization of new protocols for studying liquid-liquid phase separation involved in accurate chromosome segregation. Establishing lab protocols for TIRF microscopy for studying processes involved in microtubule polymerization.

Skills

Establishing and maintaining scientific collaborations

Experimental techniques:

Cell culture; fluorescence microscopy, TIRF microscopy; protein production; FPLC

Data analysis

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2017 – 2020

University of Virginia, postdoctoral research associate

Department of Molecular Physiology and Biological Physics

Experimental techniques:

Protein production; FPLC; protein crystallization; binding assays (ITC)

Crystallographic software:

X-ray diffraction studies on DJ1-like protein;
Recombinant protein expression, purification and
crystallization; Biophysical and biochemical
characterization of proteins and their complexes

2015-2017

**Institute of Catalysis and Surface Chemistry of the
Polish Academy of Sciences, postdoctoral researcher**

Setting up crystallography laboratory; people and
project management; design of the system for
overexpression and purification of α -ketoglutarate
dependent dioxygenase;

2014-2015

**Institute of Catalysis and Surface Chemistry of the
Polish Academy of Sciences, postdoctoral researcher**

Design and optimization of recombinant, anaerobic
production of metalloenzymes; Enzymatic
characterization of molybdoenzymes

2009 - 2013

University of Virginia, visiting graduate student

*Department of Molecular Physiology and Biological
Physics and Department of Biochemistry and Molecular
Genetics*

Midwest Center for Structural Genomics,

Center for Structural Genomics of Infectious Diseases,

New York Structural Genomics Research Consortium,

Protein X-ray diffraction studies using synchrotron
radiation protein structure determination and analysis,
recombinant protein expression, purification and
crystallization; Biophysical and biochemical
characterization of proteins and their complexes

2007-2009

Jagiellonian University, undergraduate student

Department of Cell Biology

Studies on heterogeneity of human prostate cancer cells
and gap-junction mediated cell-cell communication

2008

**Georg-August-Universität Göttingen, Institut für
Humangenetik; Socrates/Erasmus exchange program
student**

Investigation of the level of ccdc33 gene expression in
various tissues

PyMOL, Coot, HKL3000, CCP4 package

Operating systems: Linux, Windows

Skills:

People and project management

Experimental techniques:

protein production; FPLC; protein
crystallization

Crystallographic software:

PyMOL, Coot, HKL3000, CCP4 package

Skills

Grant management; technology transfer

Experimental techniques:

Anaerobic protein production; FPLC;
spectrophotometric assays; Enzymatic
assays; HPLC

Experimental techniques:

Protein production; FPLC; binding assays:
ITC, fluorescence polarization, thermal
shift assays; spectrophotometric assays;
protein crystallization

Crystallographic software:

PyMOL, Coot, HKL3000, CCP4 package

Software: Microsoft Office (Word, Excel,
PowerPoint) and LIMS

Operating systems: Linux, Windows

Experimental techniques:

Cell culture, Western blot,
immunostaining, and cell to cell calcein
AM transfer

Experimental techniques:

Cell culture; mRNA isolation and
sequencing

Presentations

- 2020**
On line **Socially Distant Centromere; Invited oral presentation** "How can preformed kinetochore fibers emerge from prometaphase centromeres?"
- 2017**
Baltimore, MD **47th Mid-Atlantic Macromolecular Crystallography Meeting; oral and poster presentation:** "Protein purification and crystallization artifacts in macromolecular crystallography"
- 2017**
Charlottesville, VA **Structural Biology Mini Symposium; oral presentation:** "Reproducibility in macromolecular crystallography – protein purification and crystallization issues"
- 2017**
Fukuoka, Japan **BIT's 5th Annual Conference of AnalytiX- invited oral presentation:** "Protein Purification and Crystallization Artifacts – a Reproducibility Issue"
- 2016**
Charlottesville, VA **46th Mid-Atlantic Macromolecular Crystallography Meeting; oral presentation:** "Structural and biochemical characterization of novel glyoxalases from pathogenic bacteria"
- 2015**
Munich, Germany **BIO-Europe Meeting; technology offer presentation:** "Heterologous expression of steroid C25 dehydrogenase from Sterolibacterium denitrificans - a MGD, FeS and heme containing heterotrimer"
- 2015**
Balatonfured, Hungary **IX. Molybdenum & Tungsten Enzymes Conference**
poster presentation: "Heterologous expression of steroid C25 dehydrogenase from Sterolibacterium denitrificans - a MGD, FeS and heme containing heterotrimer"
- 2015**
Warsaw, Poland **MultiPole-2 (Multi-Pole Approach to Structural Science); poster presentation:** "Heterologous expression of steroid C25 dehydrogenase from Sterolibacterium denitrificans - a MGD, FeS and heme containing heterotrimer"
- 2015**
Charlottesville, VA **Departmental oral presentation:** "Characterization of steroid C25 dehydrogenase from Sterolibacterium denitrificans"
- 2014**
Hamburg, Germany **7th International Congress on Biocatalysis**
poster presentation: "Heterologous expression of steroid C25 dehydrogenase from Sterolibacterium denitrificans"
- 2013**
Honolulu, HI **American Crystallographic Association ACA2013; poster presentation:** "Molecular basis of Survivin recognition of two histone code marks to spatially define the inner centromere of mitotic chromosomes"
- 2013**
Durham, NC **43rd Mid-Atlantic Macromolecular Crystallography Meeting; oral presentation:** "Molecular basis of how Survivin recognizes two histone code marks to spatially define the inner centromere chromosome region of mitotic chromosomes"

- 2012**
Charlottesville,
VA **42nd Mid-Atlantic Macromolecular Crystallography Meeting; poster presentation:** “Structural Basis of Recognition of Histone H3 Threonine-3 phosphorylation by Survivin”
- 2011**
Denver, CO **51st American Society for Cell Biology Meeting;**
poster presentation: “Structural Basis of Interaction between Human Survivin and N-terminus Histone H3 Phosphorylated on Threonine 3”

Workshops

- 2020 – on line** **In situ structural biology: From Cryo-EM to integrative modelling**
- 2015**
Warsaw, Poland **SKILLS project: Self-presentation and public speaking**
- 2015**
Rovinj, Croatia **Fundamentals of Materials Analysis Using Powder Diffraction**, workshop organized by International Centre for Diffraction Data and Croatian Association of Crystallographers during ECM29
- 2015**
Rovinj, Croatia **Making the most of PDB and EMDB data**, workshop organized by PDBe and Croatian Association of Crystallographers during ECM29
- 2015**
Cracow, Poland **SKILLS project: Presentation of research results (Social Media & Web 2.0)**
- 2015,**
Cracow, Poland **SKILLS project: Training course on commercialization of research results**
- 2013**
Honolulu, Hi **„Get the Most out of the Cambridge Structural Database System”** during American Crystallographic Association Meeting
- 2011**
Chapel Hill, NC **Mid-Atlantic BioSAXS Workshop**

Honors and Awards

- 2016** Stipend START, Foundation for Polish Science
- 2015** Award for the best popular-science presentation; Institute of Catalysis and Surface Chemistry of the Polish Academy of Sciences, Cracow

Teaching

- 2019**
Krakow, Poland **Webinar:** Preparation of protein sample for crystallization experiments (Expression, Purification and Validation) during Workshop on data collection and structure solving

2019 **Webinar:** Cryo-crystallography: preparation of crystals for data collection at
Krakow, Poland cryogenic temperatures during Workshop on data collection and structure solving

Publications (h-index = 11, number of citations as of January 2022 > 680)

1. Cooper DR, Grabowski M, Zimmerman MD, Porebski PJ, Shabalin IG, Woinska M, Domagalski MJ, Zheng H, Sroka P, Cymborowski M, Czub MP, **Niedzialkowska E**, Venkataramany BS, Osinski T, Fratzczak Z, Bajor J, Gonera J, MacLean E, Wojciechowska K, Konina K, Wajerowicz W, Chruszcz M, Minor W.
State-of-the-Art Data Management: Improving the Reproducibility, Consistency, and Traceability of Structural Biology and in Vitro Biochemical Experiments.
Methods Mol Biol. 2021;2199:209-236.
2. Mrugała B, Miłaczewska A, Porebski PJ, **Niedzialkowska E**, Guzik M, Minor W, Borowski T
A study on the structure, mechanism, and biochemistry of kanamycin B dioxygenase (KanJ)-an enzyme with a broad range of substrates.
FEBS Journal. 2020 Jun 27. doi: 10.1111/febs.15462. Online ahead of print.
3. Kluza A, Wojdyla Z, Mrugała B, Kurpiewska K, Porebski PJ, **Niedzialkowska E**, Minor W, Weiss MS, Borowski T (2020)
Regioselectivity of hyoscyamine 6 β -hydroxylase-catalysed hydroxylation as revealed by high-resolution structural information and QM/MM calculations
Dalton Transactions 2020,49, 4454-4469
4. Trivedi P, Palomba F, **Niedzialkowska E**, Digman MA, Gratton E, Stukenberg PT. (2019)
The inner centromere is a biomolecular condensate scaffolded by the chromosomal passenger complex.
Nature Cell Biology 2019 Sep;21(9):1127-1137
5. Handing KB*, **Niedzialkowska E***, Shabalin IG*, Kuhn ML, Zheng H, Minor W (2018)
Characterizing metal-binding sites in proteins with X-ray crystallography
Nature Protocols 13 – front cover article
6. Kluza A, **Niedzialkowska E**, Kurpiewska K, Wojdyla Z, Quesne M, Kot E, Porebski PJ, Borowski T (2018) **Crystal structure of thebaine 6-O-demethylase from the morphine biosynthesis pathway**
Journal of Structural Biology **202(3)**:229-235
7. Rugor A, Wójcik-Augustyn A, **Niedzialkowska E**, Mordalski S, Staroń J, Bojarski A, Szaleniec M. (2017) **Reaction mechanism of sterol hydroxylation by steroid C25 dehydrogenase - Homology model, reactivity and isoenzymatic diversity**
Journal of Inorganic Biochemistry **173**:28-43.



8. **Niedzialkowska E.**, Mrugała B., Rugor A., Czub M. P., Skotnicka A., Cotelesage J.J.H., George G.N., Szaleniec M., Minor W., Lewiński K. (2017)
Optimization of overexpression of a chaperone protein of steroid C25 dehydrogenase for biochemical and biophysical characterization
Protein Expression and Purification **134**: 47-62
9. Rugor A., Tataruch M., Staron J., Dudzik A., **Niedzialkowska E.**, Nowak, P. Hogendorf A., Michalik-Zym A., Napruszewska D. B., Jarzebski A., Szymanska K., Bialas W., Szaleniec M. (2016)
Regioselective hydroxylation of cholecalciferol, cholesterol and their derivatives by steroid C25 dehydrogenase
Applied Microbiology and Biotechnology 101(3):1163-1174
10. Grabowski M.* , **Niedzialkowska E.***, Zimmerman M. D., Minor W. (2016)
The impact of structural genomics: the first quindecennial
Journal of Structural and Functional Genomics. **17**: 1-16.
11. **Niedzialkowska E.***, Gasiorowska O.* , Handing K. B., Majorek K.A. Porebski P. J., Shabalin I. G., Zasadzinska E., Cymborowski M., Minor W. (2016)
Protein purification and crystallization artifacts: The tale usually not told.
Protein Science **25**: 720-33. - front cover article
12. **Niedzialkowska E.**, Wang F., Porebski P. J., Minor W., Higgins J. M., Stukenberg, P. T. (2012).
Molecular basis for phosphospecific recognition of histone H3 tails by Survivin paralogues at inner centromeres.
Molecular Biology of the Cell **23**, 1457-1466. - highlighted article
13. Szpak K., Wybieralska E., **Niedzialkowska E.**, Rak M., Bechyne I., Michalik M., Madeja Z. Czyz, J. (2011).
DU-145 prostate carcinoma cells that selectively transmigrate narrow obstacles express elevated levels of Cx43.
Cellular & Molecular Biology Letters **16**, 625-637.
14. Wang F., Dai J., Daum J. R., **Niedzialkowska E.**, Banerjee B., Stukenberg P. T., Gorbsky G. J., Higgins J. M. (2010).
Histone H3 Thr-3 phosphorylation by Haspin positions Aurora B at centromeres in mitosis.
Science **330**, 231-235.
15. Kaczmarek K., **Niedzialkowska E.**, Studencka M., Schulz, Y., Grzmil P. (2009).
Ccdc33, a predominantly testis-expressed gene, encodes a putative peroxisomal protein.
Cytogenetic and Genome Research **126**, 243-252.



*- contributed equally

PDB deposits (number of deposits as of January 2022 = 39)

7LBQ,7LBO,7LBK,7LBP,6TTO,6TTN,6TTM,6SOR,6SOT,6SOS,6SOV,6SOU,6SOW,5V0Z,5U2K,5O7Y,5O9W,4WCZ,4TNN,3HHL,3UEC3UED,3UEE,3UEF,3UEG,3UEH,3UEI,3OT1,4OAD,4YYC,4ZNZ,4GQA,4IW7,3V4D,3V48,4K2H,4JXU,4QGN,4IQ