Elisabeth Wetzer

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Education

Ph.D. Computerized Image Processing ∘ Uppsala University (UU)   2017 -
- **Graduate School:** Centre for Interdisciplinary Mathematics (CIM)
- **Department:** Information Technology (Visual Information and Interaction, Vi3)
- **PhD topic:** *Multi-layer object representations for integrated shape and texture analysis, with applications in biomedical image processing*
  Supervisor: Prof. Natasa Sladoje, Prof. Joakim Lindblad, Prof. Ida-Maria Sintorn
  Description: Development of the theoretical foundation for a class of methods applicable to multi-layered heterogeneous object representations by feature selection and texture descriptors as well as machine learning algorithms for object classification.

Graduate Trimester ∘ Institut Henri Poincaré (IHP), Sorbonne Université, France   Jan- Apr 2019
- **Topic:** *The Mathematics of Imaging*

M.Sc. Biomedical Engineering ∘ Vienna University of Technology (TUW)   2014 - 2017
- **Specialization:** Mathematical and Computational Biology
- **Master's thesis:** *Evaluating a Novel Approach for Fiber Analysis in Forensic Applications*
  Supervisor: Prof. Hans Lohninger
  Description: Investigation of the feasibility of automated fiber analysis in forensics using Raman spectroscopy.

Master Program Computational Physics (Erasmus) ∘ Umeå University   2014 - 2015
- **Master's project:** *Development of computer based quantification and analysis of movement*
  Supervisor: Prof. Magnus Andersson
  Description: Multiple object tracking using Kalman Filters to evaluate impact of pharmaceuticals on behavior of model organisms.

B.Sc. Technical Mathematics ∘ Vienna University of Technology (TUW)   2007 - 2014
- **Bachelor's thesis:** *Voronoi Diagrams of Moving Points*
  Supervisor: Dr. Christian Steineder
  Description: Voronoi Diagrams over time using Davenport-Schinzel Sequences.

Professional Appointments

Uppsala University, Sweden ∘ Teaching Assistant and Supervision   Sept 2018 -
- Master Thesis Supervision in the Image Analysis and Machine Learning Programme on the topic "Multimodal Contrastive Representation Learning - 3D CoMIR", Spring 2023
- Introduction to Image Analysis, Fall 20/21, Fall 21/22
- Computer Assisted Image Analysis 1 & 2, Fall 2018/19, Spring 2018/19
- Scientific Visualization, Fall 2019
- Algorithms and Data Structures 2, Fall 2018

Reviewing Experience ∘   2019 -
- International Conference on Learning Representations (ICLR) 2023, 2022
- Conference on Neural Information Processing Systems (NeurIPS) 2023, 2022
- International Conference on Machine Learning (ICML) 2023, 2022
- IEEE International Symposium on Biomedical Imaging (ISBI) 2019
- Scandinavian Conference on Image Analysis (SCIA) 2019

Conference and Seminar Organization ○   2012 -
· Organizer of the PhD Lunch Seminar Series of the Centre for Interdisciplinary Mathematics (CIM) at Uppsala University 2022, 2023
· Submission Chair and Conference Organizer of the Swedish Symposium for Image Analysis (SSBA) 2022
· Volunteer at International Conference on Learning Representations (ICLR) 2022
· Local Organizer at 9thVienna International Conference on Mathematical Modelling (MathMod)
· Volunteer at the World Congress of Tissue Engineering and Regenerative Medicine (TERMIS) 2012

Session Chair ○
· Chair at Swedish Symposium for Image Analysis (SSBA) 2019
· Co-Chair at Vienna International Conference on Mathematical Modelling (MathMod) 2018

Uppsala University, Sweden ○ Communication Officer   2019 - 2023
· Centre for Image Analysis
· Human Computer Interaction

National Insitute of Informatics in Tokyo, Japan ○ Intern   Feb - July 2017
· Machine Learning/Data Mining/Algorithmics (Houle Lab)
Continuing the development of the continuous intrinsic dimensionality model, its theoretical applications to databases, data mining and machine learning and the theoretical analysis of the algorithmic performance in similarity search, clustering, classification and outlier detection.

Vienna University of Technology ○ Staff Member and Tutor   Mar 2016- 2017
· Staff member at the Institute of Chemical Technologies and Analytics and student tutor for the Institute of Analysis and Scientific Computing;
Core member of a reading group on statistical learning and cluster analysis, teaching exercises for engineering students in mathematics and hosting mentoring sessions (FaMe at TUW) for electrical engineering students in mathematics, physics and electrical engineering.

University of Southern California ○ Visiting Student Research Assistantship   July - Sept, 2013
· with the Molecular and Computational Biology Graduate Program at the Department of Biological Sciences; Tracking algorithms for Drosophila and analysis of their social behavior in dependence on the ratio of different genotypes and gender. Participation in reading groups for machine learning and collective behavior and joined a seminar series on various topics in population genetics, quantitative genetics and the genetics and speciation of Drosophila.

University of Southern California ○ Intern   February 2013
· Development and implementation of agent-based algorithms in game theory.

Ludwig Boltzmann Institut for Experimental and Clinical Traumatology ○ Intern   Dec 2012 - Oct 2013
· Time Series Analysis for thromboelastometry modeling.

Natural History Museum of Los Angeles County ○ Volunteer   2003-2006, Summers
· Long-term preparation of Crustacea specimen and creation of sphaeromatid isopod diversity map.

Research and Summer Schools

The Mathematics of Imaging ○ Centre Int. de Recontres Mathématiques, France	Jan 2019
SIAM: Mathematics in Imaging Science ○ University of Bologna, Italy	May 2018
Heidelberg Laureate Forum ○ Heidelberg University, Germany	September 2017
Data Driven System Simulation - Computational Complex Systems ○ TU Vienna	September 2017
Discrete and Geometric Tomography ○ Politecnico di Milano, Italy	Nov 2016
Longitudinal Data Analysis ○ University of Jyväskylä, Finland	Aug 2016
Computational Mechanics for Crashworthiness ○ Technical University Munich, Germany	Mar 2016

Digital Signal and Image Processing ∘ Czech Technical University in Prague	Nov 2015
Vienna Summer School for Assistive Technology ∘ Technikum Wien, Austria	Jul 11-21, 2015
CIMPA Research School in Stochastic Processes & Applications ∘ NUM, Mongolia	Jul - Aug, 2015
Winter School Arctic Science ∘ Swedish Institute of Space Physics, Kiruna, Sweden	Jan- Feb, 2015
24th Jyväskylä Summer School ∘ University of Jyväskylä, Finland	Aug 2014
BEST Course Nanotechnology ∘ Bauman Moscow State Technical University, Russia	April 2013

Professional Associations

Swedish Society for Automated Image Analysis - SSBA ∘ Editorial Group Member — since May 2018
· The society represents Sweden as a member in the International Association for Pattern Recognition (IAPR)

Recruitment of an Assistant Professor in Social Robotics ∘ PhD student representative — September 2021
· Representing the I.T. Department in the preparatory meeting of the recruitment of an Assistant Professor

Association for Computing Machinery ∘ Chair — 2019-2020
· Uppsala University ACM-W Student Chapter

Board of the Centre for Interdisciplinary Mathematics ∘ PhD student representative — since Sept 2018
· Representing the Faculty of Science and Technology of Uppsala University at CIM

Board of UPPMAX ∘ PhD student representative — 2019-2020
· Representing the Faculty of Science and Technology of Uppsala University at the Uppsala Multidisciplinary Center for Advanced Computational Science

Reference group on career paths in academia ∘ PhD student representative — July 2019
· Representing the Faculty of Science and Technology of Uppsala University at the Referensgrupp Karriärvägar inom akdemin

Public Outreach

Soapbox Science Uppsala ∘ Local Organizing Team — 2019 - 2022
· Inviting and Selecting Speakers, Event Advertisment

SciFest ∘ Contributor — March 2020
· Organizing AI Bingo, Robotics booth

IT20 Celebrations ∘ Speaker — January 2020
· Talk on "Artificial Intelligence in Medicine"

Pint of Science Uppsala ∘ Speaker — May 2019
· Talk on "Images, Data and how they shape Science"

Soapbox Science Uppsala ∘ Speaker — May 2019
· Talk on "Training Machines to Detect Cancer"

Publications, Talks and Posters

Invited Talks

Peer Reviewed Publications

E. Wetzer, N. Pielawski et al. ∘ UU   December 2020

· *CoMIR: Contrastive Multimodal Image Representation for Registration;* Neural Information Processing Systems (NeurIPS) 2020

E. Wetzer, J. Lindblad, J. Gay, H. Harlin, N. Sladoje ∘ UU   April 2020

· *When texture matters: Texture-focused CNNs Outperform General Data Augmentation and Pretraining in Oral Cancer Detection;* International Symposium on Biomedical Imaging (ISBI) 2020

E. Wetzer, J. Lindblad, I.-M. Sintorn, K. Hultenby, N. Sladoje ∘ UU   September 2018

· *Towards automated multiscale imaging and analysis in TEM: Glomerulus detection by fusion of CNN and LBP maps;* Bioimage Computing, European Conference on Computer Vision (ECCV) 2018

Elisabeth Wetzer, Hans Lohninger ∘ Vienna University of Vienna   February 2018

· *Image Processing Using Color Space Models for Forensic Fiber Detection;* 9th Vienna International Conference on Mathematical Modelling (MathMod)

Others

E. Wetzer, J. Lindblad, N. Sladoje ∘ UU   March 2023

· *(Presentation) Partial Dimensional Collapse in Contrastive Learning using Intermediate Layers;* Swedish Symposium on Image Analysis 2023

N. Pielawski, J. Öfverstedt, E. Wetzer ∘ UU   March 2023

· *(Presentation) Global Multimodal Image Registration using Gaussian Processes;* Swedish Symposium on Image Analysis 2023

E. Wetzer, N. Pielawski, et al. ∘ UU   March 2022

· *(Presentation) Rotationally Equivariant Representation Learning for Multimodal Images;* Swedish Symposium on Image Analysis 2022

E. Wetzer, E. Breznik, J. Lindblad, N. Sladoje ∘ UU   March 2022

· *(Poster) Label-Free Reverse Image Search of Multimodal Microscopy Images;* International Symposium on Biomedical Imaging (ISBI) 2022

E. Wetzer, E. Breznik, J. Lindblad, N. Sladoje ∘ UU   January 2022

· *(Preprint) Cross-Modality Sub-Image Retrieval using Contrastive Multimodal Image Representations;* arxiv

E. Wetzer, N. Pielawski et al. ∘ UU   Nov 2021

· *(Presentation) Contrastive Learning for Equivariant Multimodal Image Representations;* The Power of Women in Deep Learning

E. Wetzer, N. Pielawski, et al. ∘ UU   December 2020

· *(Presentation) CoMIR: Contrastive Multimodal Image Representation for Registration;* GCPR 2020

E. Wetzer, N. Pielawski, et al. ∘ UU   September 2021

· *(Presentation) Registration of Multimodal Microscopy Images using CoMIR - learned structural image representations;* COMULIS Conference 2021

E. Wetzer, N. Pielawski, et al. ∘ UU   March 2020

· *(Presentation) Cross-modal Representation Learning for Efficient Registration of Multiphoton and Brightfield Microscopy Images of Skin Tissue;* NEUBIAS Conference 2020

N. Koriakina, N. Sladoje, E. Wetzer, J. Lindblad ∘ UU · · · · · · · · · · · · · · · · · March 2020
· *Uncovering hidden reasoning of convolutional neural networks in biomedical image classification by using attribution methods;* NEUBIAS Conference 2020

E. Wetzer, J. Gay, H. Harlin, J. Lindblad, N. Sladoje ∘ UU · · · · · · · · · · · · · · · · March 2019
· *(Presentation) Oral Cancer Detection: A Comparison of Texture Focused Deep Learning Approaches;* Swedish Symposium on Image Analysis 2019

J. Gay, H. Harlin, E. Wetzer, J. Lindblad, N. Sladoje ∘ UU · · · · · · · · · · · · · · · February 2019
· *(Poster) Texture-Based Oral Cancer Detection: A Performance Analysis of Deep Learning Approaches;* NEUBIAS Conference 2019

E. Wetzer, J. Lindblad, I.-M. Sintorn, K. Hultenby, N. Sladoje ∘ UU · · · · · · · · · February 2019
· *(Poster & Talk) Towards automated multiscale Glomeruli detection and analysis in TEM by fusion of CNN and LBP maps;* NEUBIAS Conference 2019

E. Wetzer, J. Lindblad, I.-M. Sintorn, K. Hultenby, N. Sladoje ∘ UU · · · · · · · · · January 2019
· *(Poster) Automation of detection and analysis of Glomerulus by fusion of LBP maps and CNN;* IHP Winterschool: The Mathematics of Imaging 2019

E. Wetzer, J. Lindblad, I.-M. Sintorn, K. Hultenby, N. Sladoje ∘ UU · · · · · · · · September 2018
· *(Presentation) Towards automated multiscale imaging and analysis in TEM: Glomeruli detection by fusion of CNN and LBP maps;* 2nd Swedish Symposium on Deep Learning 2018

I.-M. Sintorn, A. Dragomir, K. Hultenby, A. Suveer, E. Wetzer, et al. ∘ UU · · · · · · · May 2018
· *Facilitating ultrastructural pathology through automated imaging and analysis;* 14th European Congress on Digital Pathology and the 5th Nordic Symposium on Digital Pathology

E. Wetzer, ∘ Umeå University · August 2015
· *(Poster) Development for computer based quantification and analysis of movement;* International symposium in Stochastic Processes and their Applications at the National University of Mongolia