

Nadina Zweifel

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Professional Summary

An audio engineer with 4+ years of work experience in live sound and studio recordings as well as a biomedical engineer with 4+ years of experience in signal processing and data analysis to solve computational and biomedical research problems. Used various signal processing techniques, optimization, and machine learning methods to analyze experimental and simulated data as well as build and validate now publicly available biomechanical simulation software. Eager to improve and apply these skills to real-world signal processing and data science problems.

Professional Experience

UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA
Research Assistant | Summer 2016

- Collection and analysis of physiological data (skin conductance, heart rate, and pupil measurements) to predict state of arousal and attention during psychophysical experiments

AMWAY, Ada, MI

Research Consultant | 2015 (2 months)

- Consulting in experimental design, data collection, and data analysis for research study using non-invasive brain activity measurements (EEG) to assess customer preferences.

CYTOSURGE, Zurich, Switzerland

Technical Assistant | 2013 – 2014

- Quality control of atomic force microscope (AFM) components using scanning electron microscopy (SEM)
- Assisting in manufacturing and assembling components for FluidFM™ Technology
- Packaging of FluidFM™ end products

SONOVA GROUP (PHONAK AG), Staefa, Switzerland

Research & Development Intern | Summer 2012

- Assisted in quality control of hearing aids and accessories before production launch
- Consulted in audio engineering related issues to improve functionality of audiology testing rooms
- Performed sound measurements in a reverberation room to enable simulation of different acoustical testing scenarios

AUDIOCONSULTING AG, Volketswil, Switzerland

Audio Engineer | 2010 – 2013

- Supervised audio network center of television sports channel (Teleclub Sport AG) to guarantee flawless transmission of audio signals from stadia to consumer
- Mixed sound in live sports television studio
- Leading and assisting audio engineer at various live events including festivals, concerts, and conferences.

Technical Skills

- Programming languages like **C/C++, Python, Matlab**, including **Tensorflow** and **Keras**
- **Collection, analysis, and visualization of real-world data.**
- **Classical signal processing techniques** for filtering, artifact removal, and spectrum analysis
- Development and Validation of **analytical and predictive models** based on experimental data
- **Dimensionality reduction algorithms** and **feature extraction** using machine learning
- **Predictive modeling** using **artificial neural networks** for classification and regression
- **Genetic and evolutionary algorithms** to optimize artificial neural networks
- Acquisition, processing, and analysis of **3D scanning data**

Professional Skills

- **Critical thinking** and **problem-solving skills**
- **Initiative** and **creative attitude, adaptability** and **propensity to learn** new methods and techniques
- Writing **scientific publications** and delivering **presentations to technical and non-technical audiences**
- Demonstrated **leadership and mentoring skills**
- Proficiency level **English**, native language **German** and **Swiss German**, basic level Italian/French

Education

NORTHWESTERN UNIVERSITY, Evanston, IL

PhD in Biomedical Engineering | 2016 – 2021

Track: Neural Engineering

Thesis: *Development of simulation software in C++ to simulate the mechanical dynamics of rat whiskers*

GRAND VALLEY STATE UNIVERSITY, Grand Rapids, MI

Master of Science in Engineering | 2014 – 2016

Major: Biomedical Engineering

Thesis: *Single subject study to measure and quantify the effect of locomotion on the frequency spectrum of a child's brain activity (EEG)*

ZURICH UNIVERSITY OF APPLIED SCIENCES, Switzerland

Bachelor of Science in Engineering | 2011 – 2014

Major: Systems Engineering with specialization in Biomedical Engineering

Thesis: *Enhancement of medical images using stochastic resonance*

Awards

- 2020 RESEARCH PROGRESS AWARD IN NEURAL ENGINEERING**
Northwestern University
- 2016 ACADEMIC EXCELLENCE AWARD IN ENGINEERING**
Grand Valley State University

Extracurricular Activities

QUEER PRIDE GRADUATE STUDENT ORGANIZATION
Executive Board Member (Treasurer) | since 2020
Northwestern University, Evanston, IL

QUEER PRIDE GRADUATE STUDENT ORGANIZATION
Executive Board Member (Web & Design Chair) | since 2019
Northwestern University, Evanston, IL

GRADUATE STUDENT ASSOCIATION
Executive Board Member (Treasurer) | 2015 – 2016
Grand Valley State University, MI

GRADUATE CHAMBER
Representative of Padnos College of Eng. & Comp. | 2015 – 2016
Grand Valley State University, MI

Peer-reviewed Journal Publications

Zweifel NO, Bush N, Abraham I, Murphey T, Hartmann MJZ (2019) WHISKiT Physics: A three-dimensional dynamical model of the rat vibrissal array. Research Article in *Proceedings of the National Academy of Sciences (in Review)*.

Preprint: <https://www.biorxiv.org/content/10.1101/862839v2>
Software: <https://github.com/SeNSE-lab/whiskitphysics>

Conference Presentations

BARRELS XXXII 2019 (TALK)

Zweifel N, Bush N, Abraham I, Murphey T, Hartmann M (2019)
A three-dimensional dynamical model of the rat vibrissal array.
Short platform talk at: Barrels XXXII 2019; Chicago, IL.

SOCIETY OF NEUROSCIENCE 2019 (POSTER)

Zweifel N, Bush N, Abraham I, Murphey T, Hartmann M (2019)
A three-dimensional dynamical model of the rat vibrissal array.
Program No. 485.14. 2018 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.