Ewa Magdalena Nowara

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EDUCATION

Ph.D. in Electrical and Computer Engineering **August 2015 – May 2021**
Rice University Houston, TX
Thesis: Imaging Photoplethysmography in Unconstrained Settings

Master of Science in Electrical and Computer Engineering **August 2015 - May 2018**
Rice University Houston, TX

Bachelor of Science in Physics **August 2011 - May 2015**
St. Mary's University San Antonio, TX
GPA: 4.0/4.0 (summa cum laude, Presidential Award Recipient)

SELECTED RECENT PUBLICATIONS (Full list on Google Scholar)

1. **Nowara, E. M.**, McDuff, D., Veeraraghavan, A. "Combining Magnification and Measurement for Non-Contact Cardiac Monitoring" *CVPR Workshops*, 2021
2. **Nowara, E. M.**, McDuff, D., "'Warm Bodies': A Post-Processing Technique for Animating Dynamic Blood Flow on Photos and Avatars" *ACM CHI Conference on Human Factors in Computing Systems, 2021*
3. **Nowara, E. M.**, McDuff, D., Veeraraghavan, A. "A Systematic Analysis of Video-based Pulse Measurement from Compressed Videos" *Biomedical Optics Express*, 12.1 494-508, *2021*
4. **Nowara, E. M.**, Marks, T. K., Mansour, H., Veeraraghavan, A. "Near-Infrared Imaging Photoplethysmography During Driving" *IEEE Transactions on Intelligent Transportation Systems, 2020*
5. **Nowara, E. M.**, McDuff, D., Veeraraghavan, A. "The Benefit of 'Distraction': Denoising Video-Based Physiological Measurements using Inverse Attention" *arXiv:2010.07770*, 2020
6. **Nowara, E. M.**, McDuff, D., Veeraraghavan, A. "A Meta-Analysis of the Impact of Skin Type and Gender on Non-contact Photoplethysmography Measurements" *CVPR Workshops*, 2020

RESEARCH AND WORK EXPERIENCE

Johns Hopkins University **May 2021 – Present**
Postdoctoral Research Fellow in Electrical and Computer Engineering *Baltimore, MD*
Mentor: Prof. Rama Chellappa

- Developed interpretable deep learning algorithms to geo-localize natural images

Los Alamos National Laboratory **October 2020 - February 2021**
Research Intern (Theoretical Division, T-5) *Remote*
Mentor: Brendt Wohlberg

- Developed self-supervised learning algorithms for computational imaging (ptychography) with a focus on "internal" learning with limited data and partially known forward models, using LSTM, conditional GANs, and autoencoders

Microsoft Research **June 2019 - June 2020**
Research Intern (Human Understanding and Empathy Team) *Redmond, WA*
Mentors: Daniel McDuff, Mary Czerwinski

- Developed a convolutional attention neural network for denoising time signals from video
- Worked on self-supervised machine learning for regression with limited and noisy labels
- Created realistic 3D avatars using computer graphics and physiological signals from video
- Recovered subtle physiological intensity variations from compressed videos using supervised deep learning for regression

Mitsubishi Electric Research Laboratories **May 2017 - June 2019**
Research Intern (Computer Vision Team) *Cambridge, MA*
Mentors: Tim Marks, Hassan Mansour

- Developed optimization and denoising algorithms using robust principal components analysis (RPCA), Alternating Direction Method of Multipliers (ADMM), Fast Iterative Shrinkage-Thresholding Algorithm (FISTA)
- Built a driver monitoring system using RGB and NIR cameras, optical and 3D printed hardware, light source synchronized with camera frame capture, face detection, tracking
- Collected and released the first large public driving dataset with face videos and physiology

SELECTED AWARDS AND HONORS

- Invited attendee, Microsoft Research AI Breakthroughs 2020
- Best graduate poster and demo, ECE Corporate Affiliates Day at Rice University 2019
- Ken Kennedy Institute for Information Technology Schlumberger Fellowship 2017 – 2018
- Selected attendee, Doctoral Consortium at Automatic Face and Gesture Recognition 2017
- Selected attendee, CRA-W (Computing Research Association) Grad Cohort 2016
- Texas Instruments Fellowship 2015
- Presidential Award (given to top 14 graduating seniors) 2015

PATENTS

Marks T., Mansour H., **Nowara E.**, Nakamura Y., Veeraraghavan A., inventors; Mitsubishi Electric Corp, Mitsubishi Electric Research Laboratories Inc, assignee. "System and method for remote measurements of vital signs." *United States patent application 16/167,668* 2019

TOOLS AND SKILLS

Programming: Python, Keras, TensorFlow, PyTorch, MATLAB, HTML/CSS, OpenCV, Docker, Arduino, Shell, Vim
Knowledgeable In: Machine Learning, Deep Learning, Computer Vision, Signal Processing, Optimization, Image Processing, Illustrator, 3D Printing, Soldering, Optics, Linux, Windows