CAGATAY ISIL

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SUMMARY

Computational imaging expert with a strong technical background, industrial experience, and team-oriented skills, seeking opportunities to leverage expertise in **computational imaging, machine learning, and computer vision**.

EDUCATION

University of California, Los Angeles, USA
Ph.D. in Electrical and Computer Engineering — 2019 – 2025
Dissertation: Deep learning-enabled computational imaging: from diffractive computing to microscopy

Middle East Technical University, Ankara, Turkey
M.S. in Electrical and Electronics Engineering — 2017 – 2019
B.S. in Physics (**Double Major**) — 2015 – 2018
B.S. in Electrical and Electronics Engineering — 2013 – 2017

SKILLS

Programming	Python, MATLAB, R, C/C++
Libraries/Frameworks	Jax, Pytorch, Tensorflow, Keras, Numpy, Pandas
Development tools	CAD (Inventor, Solidworks), LabVIEW, Zemax
Others	Microscopy, Fourier Optics, Free-space Optical Systems, Diffractive Computing

EXPERIENCE

Postdoctoral Scholar — Jul 2025 – Present
Computational 3D Microscopy Laboratory, Stanford University — *Stanford, CA*

- ML for 3D microscopy/pathology

Research Intern — Apr 2025 – Jul 2025
Scale AI — *San Francisco, CA*

- Contributed to the data curation of challenging, domain-specific problems to evaluate and benchmark the performance of frontier generative AI models

Graduate Researcher — Sep 2019 – Mar 2025
Computational Imaging Laboratory, UCLA — *Los Angeles, CA*

- Developed virtual staining techniques for bacteria and tissue using **generative adversarial networks (GANs)**
- Implemented several **classical segmentation algorithms** for image analysis.
- Implemented **image registration, stitching, and data cleaning** pipelines for various microscopy modalities.
- Built a novel **all-optical denoiser** using **deep learning** for non-iterative noise removal at the speed of light.
- Developed an **advanced display system**, composed of a pair of **CNN encoder** and **all-optical decoder**, to project super-resolved images using low-resolution modulators.
- **Experimentally validated** these AI-enabled optical systems.
- Implemented an automated system for phenotypic analysis of microalgae populations using an imaging flow cytometer and built an algae identification method using **CNNs**.
- Implemented a **Denoising Diffusion Implicit Model (DDIM)** to address the pixel super-resolution problem, achieving approximately 4x super-resolution on images.

Research Engineer — 2017 – 2019
ASELSAN Research Center — *Ankara, Turkey*

- Developed an iterative algorithm using multiple **U-nets** for the phase retrieval problem, a classical **inverse problem in imaging**.
- Implemented a **coupled deep autoencoder** to enhance resolution in **wide-field interferometric microscopy**.
- Combined a **variational autoencoder** model with triplet loss to improve clustering performance in the latent space for **representation learning**.

SELECTED PUBLICATIONS

- **Ç. Işıl**, H. C. Koydemir, M. Eryilmaz, K. de Haan, N. Pillar, K. Mentesoglu, A. F. Unal, Y. Rivenson, S. Chandrasekaran, O. B. Garner, and A. Ozcan, **'Virtual Gram staining of label-free bacteria using darkfield microscopy and deep learning,'** Science Advances, 2025
- M. J. Fanous, P. C. Costa, **Ç. Işıl**, L. Huang and A. Ozcan, **'Neural Network-Based Processing and Reconstruction of Compromised Biophotonic Image Data,'** Light:science & applications, 2024
- **Ç. Işıl**, T. Gan, F. O. Ardic, K. Mentesoglu, J. Digani, H. Karaca, H. Chen, J. Li, D. Mengu, M. Jarrahi, K. Akşit, and A. Ozcan, **'All-optical image denoising using a diffractive visual processor,'** Light:science & applications, 2024
- **Ç. Işıl**, D. Mengu, Y. Zhao, A. Tabassum, J. Li, Y. Luo, M. Jarrahi, and A. Ozcan, **'Super-resolution image display using diffractive decoders,'** Science Advances, 2022
- **Ç. Işıl**, F. S. Oktem, and A. Koç,**'Deep Iterative Reconstruction for Phase Retrieval,'** Applied Optics, 2019

*Published more than 30 peer-reviewed journal articles and conference proceedings (google scholar).

PATENTS

- A. Ozcan, **Ç. Işıl**, D. Mengu, and M. S. S. Rahman, **'Super-resolution image display and free space communication using diffractive decoders,'** WO2023244949A1, 2023

ACHIEVEMENTS, CERTIFICATES & HONORS

- Reviewer for various journals including Siggraph Asia, ACM Transactions on Graphics (TOG), Optics Letters, Optics Express, Applied Optics, Journal of the Optical Society of America A.
- Certificate for the paper entitled **"All-optical image denoising using a diffractive visual processor"** as one of the top downloaded papers of Light: Science & Applications in 2024.
- Mentored and supervised more than 5 undergraduate researchers during my PhD at UCLA.
- TUBITAK (The Scientific and Technological Research Council of Turkey) Scholarship for the M.S. degree
- TUBITAK Scholarship for the double major
- Dean's High Honor List, Middle East Technical University (All semesters, except for one)
- LabVIEW Certified Associate Developer (2017-2019)
- Honor Certificate in High School
- Ranked 2115^{th} in the national university entrance examination among two million students, 2012
- Information & Communication Technologies Certificate by Ericsson