

EXPERTISE

Deep Learning	Image Processing	Computer Vision	Computer Graphics	Visualization
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EDUCATION

- **Stony Brook University** *Sep. 2017 – Mar. 2022*
Ph.D. in Computer Science
- **Sharif University of Technology** *Sep. 2011 – Aug. 2015*
B.Sc. in Computer Engineering

RESEARCH EXPERIENCE

- **Center for Visual Computing** Stony Brook University
PhD Candidate (Focus: Deep learning, computer vision, and virtual reality) *Jun. 2016 - Present*
 - **DeepLIIF: Deep-Learning Inferred Multiplex Immunofluorescence for IHC Image Quantification**
 - *Python, R, PyTorch, Keras, OpenCV, Numpy, Skimage, Scipy, Matplotlib, Sklearn, Pillow, TiffFile, Javabridge, Numba*
 - * Designed and implemented a GAN-Based multitask deep learning model (DeepLIIF) for single-step translation, segmentation, and classification. Achieved this by designing a universal optimizer and weighted loss function, outperforming state-of-the-art models such as Mask-RCNN and nnUNet on segmentation and classification tasks.
 - * Designed and implemented a GAN-based image synthesis model for generating high fidelity IHC images using corresponding Hematoxylin and Marker images by defining style- and feature-based loss function.
 - * Developed a framework offering rigid transformations for co-registering IHC and mpIF data using Tkinter python interface.
 - * Implemented computer vision algorithms for pre- and post-processing data using skimage, scipy, numba, and matplotlib.
 - **NeuroConstruct: 3D Reconstruction and Visualization of Neurites in Optical Microscopy Brain Images**
 - *Python, Keras, Tensorflow, FluoRender, ImageJ, Matlab, OpenCV, Numpy, Skimage, Matplotlib, PyQt5, VTK*
 - * Developed an end-to-end application (NeuroConstruct) for reconstruction and visualization of 3D neuronal structures.
 - * Designed and implemented a novel 3D nested UNet-based network with skip pathways for segmenting objects in volumes using Tensorflow and Keras, outperforming state-of-the-art models including U2Net, UNet++, and UNet3+.
 - * Designed a hybrid rendering approach, combining iso-surface rendering of high-confidence classified neurites, along with real-time rendering of raw volume.
 - * Created segmentation and registration toolbox for auto & manual segmentation of neurons and coarse-to-fine alignment of serial brain sections with 3D rendered volume, 2D cross-sectional views, and novel annotation functions using PyQt5 and vtk.
 - **CrowdDeep: Nuclei detection and segmentation using crowdsourcing and deep learning**
 - *Python, Keras, Tensorflow, Amazon Mechanical Turk, JavaScript (D3 visualization)*
 - * Created a semi-automatic crowdsourcing framework for nuclei segmentation in pathology slides, allowing publication of jobs containing question and judgment phases on Amazon Mechanical Turk for collecting ground-truth segmentation dataset.
 - * Designed and implemented a novel CNN approach (CrowdDeep) for nuclei segmentation using a combination of crowd and expert annotations, outperforming expert-trained-only models.
 - * Developed a visual analytic framework for evaluation of CrowdDeep using D3 visualization.
 - **Exploration of Large Omnidirectional Images in Immersive Environments**
 - *C#, Unity® Game Engine, R*
 - * Conducted two VR user studies to evaluate our techniques over a search and comparison task using Unity® Game Engine, HTC Vive headset, and controllers.
 - * Performed quantitative analysis in R to evaluate our novel approaches against state-of-the-art methods using traditional and proposed questionnaires and metrics including SSQ, NASA-TLX, Presence, Performance, Tapping Test, and Movement with two-way RANOVA and Tukey's ladder of power.
- **Data Storage Systems and Networks Lab** Sharif University of Technology
Undergraduate Research Assistant (Focus: Operating Systems) *Sep. 2014 - Aug. 2015*
 - **B.Sc. Thesis:** Workload characterization of buffer cache layer in Linux operating system
 - * Designed an efficient data migration scheme at the OS level in a hybrid DRAM-NVM memory architecture by only allowing migrations with benefits to the system in terms of power and performance.
- **Bioinformatics Group Research** Sharif University of Technology
Undergraduate Research Assistant (Focus: Simulation) *Feb. 2014 – Aug. 2015*
 - **Cancer Simulation**
 - * Developed a Java-based system for simulating DCIS Cancer cells' growth using an agent-based model of tumor growth, followed by evolutionary game theory to model the interactions between adjacent cancer cells via gap junctions.

WORK EXPERIENCE

- **AI/ML Technology Division at Memorial Sloan Kettering Cancer Center** NYC, NY
Senior Data Scientist Feb. 2022 - Present
 - Designing deep learning approaches for various medical image analysis tasks.
- **Department of Medical Physics at Memorial Sloan Kettering Cancer Center** NYC, NY
Graduate Research Intern (Python, PyTorch) May 2021 - Sep. 2021
 - Designed deep learning approaches for cell and membrane segmentation in IHC and fluorescence microscopy images.
- **Opensource Information and Communications Technology Co. Ltd** Tehran
Software Development Intern (Java, Geoserver, PostGIS, Geotools, Maven) Jun. 2015 - Aug. 2015
 - Designed an interactive offline map with informative pins on locations.

SKILLS

- **Programming:** Proficient in Python, PyTorch, Java, Keras, Tensorflow, MATLAB, R. Experienced in C/C++, SQL, Hadoop, OpenGL, JavaScript (D3 visualization).
- **Image Analysis:** ImageJ, FluoRender, 3D Slicer, OpenSlide.

PUBLICATIONS

- **Parmida Ghahremani**, Yanyun Li, Arie Kaufman, Rami Vanguri, Noah Greenwald, Michael Angelo, Travis J. Hollmann, and Saad Nadeem, "DeepLIIF: Deep Learning-Inferred Multiplex ImmunoFluorescence for IHC Image Quantification", *Nature Machine Intelligence*, 2022.
- **Parmida Ghahremani**, and Arie Kaufman, "CrowDeep: Deep Learning from the Crowd for Nuclei Segmentation", *SPIE Medical Imaging*, 2022.
- **Parmida Ghahremani**, Saeed Boorboor, Pooya Mirhosseini, Chetan Gudisagar, Mala Ananth, David Talmage, Lorna W. Role, and Arie E. Kaufman, "NeuroConstruct: 3D Reconstruction and Visualization of Neurites in Optical Microscopy Brain Images", *IEEE Transactions on Visualization and Computer Graphics*, 2021.
- S. Mirhosseini, **P. Ghahremani**, S. Ojal, J. Marino and A. Kaufman, "Exploration of Large Omnidirectional Images in Immersive Environments," *IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Osaka, Japan, 2019.

TEACHING EXPERIENCE

- **Stony Brook University:** TA for Visualization and Visual Analytic (Spring'17), Theory of Database Systems (Fall'16), Computer Science 3 (Spring'16), Computer Science 1 (Fall'15).
- **Sharif University of Technology:** TA for Numerical Computations (Fall'14), Digital System Design (Fall'14), OS (Fall'14), Technical & Scientific Presentation (Fall'14), Advanced Programming in Java (Fall'13), Fundamentals of Programming (Fall'13).

NOTABLE PROJECTS

- **Unsupervised Co-segmentation of 3D shapes via clustering** *Stony Brook University, CSE 528 (C++, OpenGL)* Fall 2016
 - Co-segmented 3D shapes via subspace clustering and visualized them.
- **Scalable and secure concurrent evaluation of history-based access control policies** *Stony Brook University, CSE 535 (Python, DistAlgo)* Fall 2016
 - Developed the distributed coordinator proposed in "Scalable and Secure Concurrent Evaluation of History-based Access Control Policies". Extended it to a multi-version concurrency control algorithm with timestamp ordering in DistAlgo.
- **Visualization tool for network packets analysis** *Stony Brook University, CSE 564 (Python, D3 visualization, Wireshark)* Spring 2015
 - Designed a visualization tool to analyze and compare characteristics of SPDY and HTTP packets.
- **On-line aggregation for interactive analysis over large-scale spatial and temporal data** *Stony Brook University, CSE 532 (Java, Hadoop)* Fall 2015
 - Implemented a temporal and spatial SQL query executor system supporting all spatial operators.

ACTIVITIES

- **Seminar coordinator and presenter** Stony Brook University
Graphics and visualization seminar Feb 2015 - Present
 - Graphics and visualization seminar is a weekly reading group for reviewing recent works in graphics and visualization, held every semester under the supervision of Prof. Kaufman.
- **PC member of IEEE AIVR** IEEE AIVR
Technical Paper Reviewer 2019 - 2021
 - IEEE International Conference on Artificial Intelligence and Virtual Reality is a unique event, addressing researchers and industries from all areas of AI as well as Virtual, Augmented, and Mixed Reality.