# Curriculum Vitae – Chaitanya Kolluru

**Personal Information**

Chaitanya Kolluru
Boston, MA
in [www.linkedin.com/in/ckolluru](www.linkedin.com/in/ckolluru)

**Professional Objective**

Develop effective algorithms to gain insights from medical images. I focus on methods that combine traditional image processing techniques with deep learning approaches to create novel and robust solutions. I have expertise working with a wide range of pre-clinical and clinical imaging data, ranging from optical microscopy to CT.

**Education**

PhD in Biomedical Engineering                                                        *2023*
Case Western Reserve University
Thesis : Serial block-face microscopy with ultraviolet surface excitation for imaging peripheral nerves

MS in Biomedical Engineering                                                        *2018*
Case Western Reserve University
Thesis : Deep neural networks for A-line based plaque classification in intravascular optical coherence tomography images

Dual Degree (BTech and MTech) in Engineering Design                   *2014*
Indian Institute of Technology, Madras

**Employment History**

**Sr. Software Engineer (Image Processing)** Elucid Bioimaging          *August 2023-Present*

- Developing methods to automatically segment coronary vessels in CTA scans
- Assessing performance using suitable metrics, e.g., surface distance, centerline coverage
- Maintaining a database of 500+ CTA scans and annotations for model training
- Implemented methods for continuous stenosis detection and quantification

**Imaging/AI Intern** Petal Surgical                                          *May 2022 - July 2022*

- Created point-cloud based image registration methods between CT and ultrasound
- Conducted software demos for prospective seed stage investors and clinicians

**Sr. Software Engineer** Philips                                             *June 2014- June 2016*

- Coded field service applications for a group of interventional X-ray C-arm systems
- Designed and prototyped a system to check the quality of image intensifiers
- Improved fault isolation procedures for the most common field replaceable units

**Embedded Software Intern** Covidien (now Medtronic)                     *Jan 2013-June 2013*

- Implemented an electrosurgical generator's communication protocol to extract logs
- Periodically upload log data to the cloud to give engineers information on product usage
- Implemented a similar wireless data transfer mechanism for a pulse oximeter device

**Software Intern** Wipro                                                     *May 2012 - July 2012*

- Utilized an open-source beat detection software to extract common ECG parameters
- Implemented algorithms to identify critical arrhythmias from cardiologist input

**Skills**

**Operating systems :** Windows, Unix, Linux
**Programming languages :** C, C++, Python
**Scientific software :** Matlab, NI LabView
**Image visualization software :** 3D Slicer, Amira
**Toolkits and libraries :** ITK, VTK, Qt
**Deep learning frameworks :** PyTorch, Keras, Tensorflow
**ML Ops software :** Weights and Biases

| CERTIFICATIONS | Fundamentals of Accelerated Computing with CUDA C/C++ (**NVIDIA**) | *2023* |
| | Machine Learning (**Coursera**) | *2013* |

PATENTS

Wilson DL, Prabhu D, **Kolluru C**, Gharaibeh Y, Bezerra HG, & Wu H (2021). Assessment of arterial calcifications (U.S. Patent No. 11,120,548) U.S. Patent and Trademark Office

Wilson DL, Gharaibeh Y, Prabhu D, Lee J, & **Kolluru C** (2023). Plaque segmentation in intravascular optical coherence tomography (oct) images using deep learning (U.S. Patent No. 11,710,238) U.S. Patent and Trademark Office

Wilson DL, Wu H, Joseph N, **Kolluru C**, Benetz B, & Lass J (2021). Assessment of endothelial cells and corneas at risk from ophthalmological images (pending, Appl. No. 16/908059)

SELECTED
PUBLICATIONS

**Kolluru C**, Joseph N, Seckler J, Fereidouni F, Levenson RM, Shoffstall AJ, Jenkins MW, Wilson DL. NerveTracker : a Python-based software toolkit for visualizing and tracking groups of nerve fibers in serial block-face microscopy with ultraviolet surface excitation images. Journal of Biomedical Optics. 29. 10.1117/1.JBO.29.7.076501.

**Kolluru C**, Todd A, Upadhye AR, Liu Y, Berezin MY, Fereidouni F, Levenson RM, Wang Y, Shoffstall AJ, Jenkins MW, Wilson DL. Imaging peripheral nerve micro-anatomy with MUSE, 2D and 3D approaches. Sci Rep. 2022 Jun 17;12(1) :10205. doi : 10.1038/s41598-022-14166-1. PMID : 35715554 ; PMCID : PMC9205958.

Upadhye AR, **Kolluru C**, Druschel L, Al Lababidi L, Ahmad SS, Menendez DM, Buyukcelik ON, Settell ML, Blanz SL, Jenkins MW, Wilson DL, Zhang J, Tatsuoka C, Grill WM, Pelot NA, Ludwig KA, Gustafson KJ, Shoffstall AJ. Fascicles split or merge every 560 microns within the human cervical vagus nerve. J Neural Eng. 2022 Nov 3;19(5). doi : 10.1088/1741-2552/ac9643. PMID : 36174538.

**Kolluru C**, Lee J, Gharaibeh Y, Bezerra HG, Wilson DL. Learning With Fewer Images via Image Clustering : Application to Intravascular OCT Image Segmentation. IEEE Access. 2021;9 :37273-37280. doi :10.1109/access.2021.3058890. Epub 2021 Feb 11. PMID : 33828934 ; PMCID : PMC8023588.

Settell ML, Skubal AC, Chen RCH, Kasole M, Knudsen BE, Nicolai EN, Huang C, Zhou C, Trevathan JK, Upadhye A, **Kolluru C**, Shoffstall AJ, Williams JC, Suminski AJ, Grill WM, Pelot NA, Chen S, Ludwig KA. In vivo Visualization of Pig Vagus Nerve "Vagotopy" Using Ultrasound. Front Neurosci. 2021 Nov 25;15 :676680. doi : 10.3389/fnins.2021.676680. PMID : 34899151 ; PMCID : PMC8660563.

Lee J, Gharaibeh Y, **Kolluru C**, Zimin VN, Dallan LAP, Kim JN, Bezerra HG, Wilson DL. Segmentation of Coronary Calcified Plaque in Intravascular OCT Images Using a Two-Step Deep Learning Approach. IEEE Access. 2020;8 :225581-225593. doi : 10.1109/access.2020.3045285. Epub 2020 Dec 16. PMID : 33598377 ; PMCID : PMC7885992.

Lee J, Prabhu D, **Kolluru C**, Gharaibeh Y, Zimin VN, Dallan LAP, Bezerra HG, Wilson DL. Fully automated plaque characterization in intravascular OCT images using hybrid convolutional and lumen morphology features. Sci Rep. 2020 Feb 13;10(1) :2596. doi : 10.1038/s41598-020-59315-6. PMID : 32054895 ; PMCID : PMC7018759.

Joseph N, **Kolluru C**, Benetz BAM, Menegay HJ, Lass JH, Wilson DL. Quantitative and qualitative evaluation of deep learning automatic segmentations of corneal endothelial cell images of reduced image quality obtained following cornea transplant. J Med Imaging (Bellingham). 2020 Jan;7(1) :014503. doi : 10.1117/1.JMI.7.1.014503. Epub 2020 Feb 14. PMID : 32090135 ; PMCID : PMC7019185.

Gharaibeh Y, Prabhu D, **Kolluru C**, Lee J, Zimin V, Bezerra H, Wilson D. Coronary calcification segmentation in intravascular OCT images using deep learning : application to calcification scoring. J Med Imaging (Bellingham). 2019 Oct ;6(4) :045002. doi : 10.1117/1.JMI.6.4.045002. Epub 2019 Dec 27. PMID : 31903407 ; PMCID : PMC6934132.

Lee J, Prabhu D, **Kolluru C**, Gharaibeh Y, Zimin VN, Bezerra HG, Wilson DL. Automated plaque characterization using deep learning on coronary intravascular optical coherence tomographic images. Biomed Opt Express. 2019 Nov 25 ;10(12) :64976515. doi : 10.1364/BOE.10.006497. PMID : 31853413 ; PMCID : PMC6913416.

Prabhu D, Bezerra H, **Kolluru C**, Gharaibeh Y, Mehanna E, Wu H, Wilson D. Automated A-line coronary plaque classification of intravascular optical coherence tomography images using handcrafted features and large datasets. J Biomed Opt. 2019 Oct ;24(10) :1-15. doi : 10.1117/1.JBO.24.10.106002. PMID : 31586357 ; PMCID : PMC6784787.

**Kolluru C**, Prabhu D, Gharaibeh Y, Bezerra H, Guagliumi G, Wilson D. Deep neural networks for A-line-based plaque classification in coronary intravascular optical coherence tomography images. J Med Imaging (Bellingham). 2018 Oct ;5(4) :044504. doi : 10.1117/1.JMI.5.4.044504. Epub 2018 Dec 3. PMID : 30525060 ; PMCID : PMC6275844.

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PRESENTATIONS

**Kolluru C**, Jennifer C, James S, Naomi J, Jeffrey P, Jennifer C, Nicole AP, Andrew S, David W, Michael J. Ultrastructure and fiber types of the human vagus nerve. SPARC PI meeting, National Institute of Health, Bethesda, MD. June 11-14 2023.

**Kolluru C**, Upadhye A, Shoffstall A, Levenson R, Fereidouni F, Jenkins MW, Wilson DL (2023). Imaging and tracking nerve fibers using block-face serial MUSE microscopy. SPIE Photonics West : Three-Dimensional and Multidimensional Microscopy : Image Acquisition and Processing XXX.

**Kolluru C**, Subramaniam A, Liu Y, Upadhye A, Khela M, Druschel L, Fereidouni F, Levenson R, Shoffstall A, Jenkins MW, Wilson DL (2021). 3D imaging of the vagus nerve fascicular anatomy with cryo-imaging and UV excitation. Three-Dimensional and Multidimensional Microscopy : Image Acquisition and Processing XXVIII, 11649, 1164910.

Lee J, **Kolluru C**, Gharaibeh Y, Prabhu D, Zimin VN, Bezerra H, and Wilson DL (2020). Automatic A-line coronary plaque classification using combined deep learning and textural features in intravascular OCT images. Medical Imaging 2020 : Image-Guided Procedures, Robotic Interventions, and Modeling, 11315, 1131513.

Joseph N, Fitzpatrick E, **Kolluru C**, Menegay H, Burke S, Lass JH, Benetz BA, and Wilson DL (2020). Automatic segmentation with guided correction of post-keratoplasty corneal endothelial cell images and predictive feature extraction. Investigative Ophthalmology & Visual Science, 61(9), PB0048-PB0048.

Gharaibeh Y, Dong P, Prabhu D, **Kolluru C**, Lee J, Zimin V, Mozafari H, Bizzera H, Gu L, and Wilson DL (2019). Deep learning segmentation of coronary calcified plaque from intravascular optical coherence tomography (IVOCT) images with application to finite element modeling of stent deployment. Medical Imaging 2019 : Image-Guided Procedures, Robotic Interventions, and Modeling, 10951, 109511C.

**Kolluru C**, Benetz BA, Joseph N, Menegay HJ, Lass JH, and Wilson DL (2019). Machine learning for segmenting cells in corneal endothelium images. Medical Imaging 2019 : Computer-Aided Diagnosis, 10950, 109504G.

**Kolluru C**, Prabhu D, Gharaibeh Y, and Wilson DL (2018). Convolutional Neural Networks for Coronary Plaque Classification in Intravascular Optical Coherence Tomography Images. IEEE International Symposium on Biomedical Imaging 2018, Washington, DC, USA.

AWARDS

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|---|---|---|
| **Graduate Student Travel Award**, Case Western Reserve University (CWRU) | | *2023* |
| **Second Place**, Cleveland Medical Hackathon | | *2018* |
| **Verhosek Travel Award**, Case Western Reserve University (CWRU) | | *2018* |

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Imaging Science Journal