






Thomas Justin Sauer

5 Pentland Place, Coraopolis PA, 15108, USA 
 +1-412-533-2354 
 tj@sauer5.com 

 [Google Scholar](#) 
 [LinkedIn](#) 

EDUCATION

- **Ph.D., Applied Physics (Medical)** Durham, NC
Duke University Medical Physics Graduate Program 2017–2023
Dissertation: Development and application of high-resolution physiological features in XCAT phantoms for use in virtual clinical trials 
Committee: Paul Segars (chair), Ehsan Samei (advisor), Diana Cardona, Ehsan Abadi













- **M.S., Medical Physics** Durham, NC
Duke University Medical Physics Graduate Program 2015–2017
Thesis: Detectability of anthropomorphic lesions in virtual breast phantoms as determined by new local tissue density metrics 
Committee: Ehsan Samei (chair), Joseph Lo (advisor), Paul Segars, Lars Grimm


- **B.S., Physics, Mathematics, magna cum laude** University Heights, OH
John Carroll University 2012–2015
Advisor: Peifang Tian

SKILLS SUMMARY

- **Computational Environments:** Hypervisors I & II, cluster, cloud and parallel computing PROXMOX, SLURM, AWS
- **Software tools:** Virtual machines and database control QEMU, LXC, DOCKER, GIT, MARIADB, MONGODB
- **Programming languages:** Interpreted and compiled languages BASH, C/C++, CUDA, PYTHON, SQL, MATLAB
- **Machine learning:** Algorithm design & optimization; dataset curation PYTHON, PYTORCH
- **Data visualization:** Physics-based rendering; visualization for multivariate data BLENDER; MATPLOTLIB, TABLEAU, TIKZ
- **Operating systems:** Single or multi-user systems WINDOWS, MAC OS, GNU/LINUX, DOS
- **Project management:** Management software MONDAY.COM, COLLABTIVE, WIKI-LIKE PLATFORMS, CANVAS
- **Written and spoken communication:** P2P messaging; voice/video platforms SLACK, DISCORD, ZOOM, TEAMS
- **Mentoring experience:** Experience mentoring junior and senior colleagues GRADUATE STUDENTS, PROGRAMMING STAFF

EXPERIENCE

- Center for Virtual Imaging Trials (CVIT)** Durham, NC
Research assistant 2015–2023
 - **Lead developer for computational projects from early research projects through transition to scalable production code:** Experience producing software from research-level code to scalable production code.
 - Lead developer and tester for CVIT PlaqueTool (in collaboration with Elucid BioImaging) DEV1 
 - Lead developer and tester for CVIT LiverTool DEV2 
 - Lead developer and tester for CVIT VesselTool DEV3 
 - Lead developer and tester for CVIT XLesionTool DEV4 
 - **Applied statistics and machine learning:** Experience designing and training/testing/validating machine learning models using PyTorch to implement models of DC-GAN, style-transfer; predictive models; ROC analysis
 - Machine learning and application to medical data ML1 
 - Statistical analysis of patient populations undergoing chest CT for coronary artery disease SA1  SA2  SA3  SA4 
 - **Science/data communication:** Frequent presentation at international scientific conferences
 - Presenting research on deep convolutional generative adversarial (DC-GAN) applications here COMM1 
 - Experience in technical communication COMM2 
 - Technical presentation list COMM3 
 - **Virtualization (Cloud-based and local hardware):** Develop distributable standalone simulation software for multiple platforms, with/without GUI
 - **Computational modeling:** Develop detailed 3D models of human anatomy based on scalable algorithms
 - **Model visualization:** Physics-based rendering of 3D computational models of human anatomy and disease features
 - **Collaborative algorithm optimization:** Training model parameters/hyperparameters; testing/validating output of (un)supervised algorithms

- Duke University** Durham, NC
Teaching assistant for “ADVANCED IONIZING MEDICAL IMAGING (MP732)” 2019
 - **Course materials and supporting materials for data visualization:**
 - Displaying and analyzing technical data VIS1 

- John Carroll University** University Heights, OH
Teaching assistant for “INTRODUCTORY PHYSICS LAB (PH135L)” 2014–2015