

KAY SUN, PH.D.

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SUMMARY OF QUALIFICATIONS

- Experience in deep learning of medical images, data science and machine learning of medical data, data analysis and visualization, cloud data solution, computational modeling and software development.
- Proficient in Python, C++, PyData stack, Azure, scikit-learn, Tensorflow, Keras, OpenCV.
- Successful at hands-on development, strategic architecture design and management of teams.

EXPERIENCE

(self-employed) **Studio Vodels, Madison, WI | Atlanta, GA**

2019 – now **Solutions Architect - Data & AI (Freelance)**

Hands-on and strategic roles including principal engineer, product manager, solutions architect.

Data Engineering (Azure/Flask/Python)

- Designed and led a team to build IoT gateway solution to connect a medical device for remote data collection
- Designed data models, developed ETL processes, and built data warehouses and web dashboards for medical data

Data Science (scikit-learn/AutoGluon/Pandas/Python)

- Used data analytics to understand, explain, and problem solve clinical data anomalies
- Designing and developing ML models to predict patient treatment outcomes after medical therapies

Deep Learning (OpenCV/Keras/Tensorflow/Python)

- Designed and developed ensemble 3D U-Net model to automate segmentation of nerves from ultrasound images for US-guided regional anesthesia
- Designed and developed 3D U-Net model and framework to predict 3D dose distribution for radiation therapy planning
- Designed and developed a CNN-based decision support tool for rapid analysis of fundus retina images to detect retinal abnormalities

HealthMyne, Madison, WI (startup closed)

2018 – 2019 **Senior Scientist – Deep Learning**

Designed, developed and deployed machine learning models (OpenCV/Tensorflow/DL4J) to

- Classify exam groups of MR images
- Segment brain tumors in MR images and liver organs in CT images

CFD Research Corporation, Huntsville, AL

2016 – 2018 **Principal Scientist**

2013 – 2016 **Senior Research Scientist**

- Designed and developed a burn injury assessment tool with morphable 3D human body models (OSG/Qt/C++/Android | Phase I/II)

- Designed and led a team to develop software tool to perform respirator mask sizing and predict protective fit using 2D images (OSG/Qt/C++/Android | Phase I/II)
- Designed and led a team to develop ocular models for drug delivery simulations (OSG/Qt/C++ | FDA U01)

EDUCATION

Rice University, Houston, TX

Ph.D.

Bioengineering

- Thesis: A Finite Element Approach Towards Biomechanical Optimization of Prophylactic Vertebroplasty

Georgia Institute of Technology, Atlanta, GA

B.Sc.

Chemical Engineering

SKILLS

Languages: Python, C++, Unix/Linux Shell, SQL
Web Application: HTML/CSS, Flask, Plotly
IDE: PyCharm, Jupyter Lab, VS Code, IntelliJ
Cloud Computing: Azure
Machine Learning: Keras, Tensorflow, scikit-learn, AutoGluon, DL4J
Visualization Tools: ImageJ, Meshlab, Paraview, OpenCV, OpenSceneGraph
Project Management: Azure DevOps, Jira, Confluence, Git

GRANTS AND CONTRACTS

U.S. Department of Defense, Chemical and Biological Defense

Protective Mask Sizing App

DoD SBIR 2016.1 CBD16-005 Phase I, Option, Phase II

Kay Sun (PI)

U.S. Department of Defense, Department of the Army

Burn Injury Assessment Tool with Morphable 3D Human Body Models

DoD SBIR 2015.1 A15-055 Phase I, Option, Phase II

Kay Sun (PI)

Food and Drug Administration (FDA)

An integrated multiscale-multiphysics modeling and simulation of ocular drug delivery with whole-body pharmacokinetic response

1U01FD005219 (2014 – 2017)

Kay Sun (PI)

PATENTS

U.S Patent 2022/0203124 A1: "Planning apparatus for planning a radiation therapy", June 30, 2022

PUBLICATIONS (out of 26 total)

1. Babier, A., Zhang, B., ..., **Sun, K.**, et al. "OpenKBP-Opt: An international and reproducible evaluation of 76 knowledge-based planning pipelines", *Physics in Medicine and Biology*, Accepted
2. Pak, J., Chen, Z., **Sun, K.**, et.al. "Computational Modeling of Drug Transport Across the In Vitro Cornea." *Computers in Biology and Medicine*, 2018 vol 92(1); 139-146

CONFERENCE PAPERS (out of 33 total)

1. Gering D., **Sun, K.**, Avery, A., et. al. "Semi-automatic Brain Tumor Segmentation by Drawing Long Axes on Multi-plane" Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries. BrainLes 2018. Lecture Notes in Computer Science, vol 11384
2. **Sun, K.**, Rossi, M., Zhou, X., et al. "Burn Injury Assessment Tool with Morphable 3D Human Body Models" Transactions of MHSRS: Military Health System Research Symposium, August 15th – 18th 2016, Orlando, FL