Jacob Shen

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Technical Skills

Languages & Tools: Python, Java, RAG Pipelines, CI/CD Pipelines, LLMs (ChatGPT, LlamaIndex, LangChain), API Development (FastAPI, Falcon), AWS (SageMaker, EC2, Lambda), PyTorch, TensorFlow, Docker, Kubernetes

Expertise: Reinforcement Learning, Deep Learning, AI Agent, Bayesian Statistics, Causal Inference, Experimental Design

Experience

Senior Applied Scientist — Remote/Issaquah, WA
SonderMind — *Mar 2023 – Present*

- Orchestrated the full Machine Learning (ML) Engineer lifecycle for a dynamic personalized recommendation service, delivering home page content via the mobile app, enhancing care efficiency and increasing user engagement by 25%.
- Designed and led the end-to-end development of the AI Concierge (Chatbot), leveraging OpenAI GPT models and a custom Retrieval Augmented Generation (RAG) system. Integrated MongoDB and PostgreSQL to deliver personalized care journeys, increasing 18% in therapy conversion rates.
- Designed and conducted a pilot experiment for an AI-driven paid search optimization system integrating LLMs for ad keyword generation, Reinforcement Learning for bid optimization, and a topic-based predictive model for evaluation; resulted in a 35% increase in marketing ROI during the pilot.
- Pioneered the development of tooling for continuous, reproducible, and automated deployment of ML models and services via AWS, employing CI/CD pipelines, Docker containers, and Kubernetes for scalable and efficient ML operations.

Senior Applied Scientist — Remote/Issaquah, WA
Mindstrong Health (acquired by SonderMind) — *May 2022 – Mar 2023*

- Designed and developed comprehensive end-to-end machine learning systems for Behavioral Healthcare Technology Services, enabling personalized, measurement-based care frameworks.
- Developed and deployed a scalable Matrix Factorization recommender system to optimize content recommendations, enhancing personalized care and improving user engagement.
- Developed a smartphone behavioral measure and monitoring system for sleep, modeling anomalies with sensor data to improve provider therapy precision by 20% via cohort analysis.

Senior Research Statistician — Seattle, WA
Fred Hutchinson Cancer Center — *Nov 2018 – Apr 2022*

- Led the application of advanced Statistical and Machine Learning techniques to longitudinally evaluate treatment effects using patient data from clinical trials, fitness tracking, and electronic health records, enhancing the accuracy of patient outcome predictions.
- Developed automated Machine Learning pipelines for robust data preprocessing and feature extraction, facilitating the lab's transition from purely experimental research to incorporating computational techniques.

Statistician / Research Manager — La Jolla, CA
UC San Diego Health — *Sep 2015 – Oct 2018*

- Headed the statistics unit within the Head & Neck Clinical and Translational Research Lab, driving the strategic application of statistical analyses in clinical research, resulting in the publication of research papers.
- Implemented Machine Learning algorithms and Data Visualization techniques using R and Python to analyze medical image data and large-scale clinical trial data, yielding critical insights for clinical decision-making, leading to the improvement in treatment plans.
- Authored research manuscripts and effectively communicated complex statistical findings to a diverse range of stakeholders, enhancing the impact and reach of research outcomes.

Education

University of California San Diego — La Jolla, CA
M.S. in Statistics / Ph.D. in Biostatistics (not completed) — *2018*

Xiamen University — Xiamen, China
B.S. in Computational Mathematics — *2013*

Publications

• Knights J, **Shen H** *et al.* **Association of Smartphone Usage Patterns with Sleep and Mental Health Symptoms in a Clinical Cohort Receiving Virtual Behavioral Care: A Retrospective Study**. *SLEEP Advances*, zpad027, 2023.

• Knights J, Bangieva V, Passoni M, Donegan M, **Shen H** *et al.* **A Framework for Precision "Dosing" of Mental Healthcare Services: Algorithm Development and Clinical Pilot**. *International Journal of Mental Health Systems*, 17(1), 21, 2023.

• Ueland K, Sanchez SC, Rillamas-Sun E, **Shen H** *et al.* **A Digital Health Intervention to Improve Nutrition and Physical Activity in Breast Cancer Survivors: Rationale and Design of the Cook and Move for Your Life pilot and Feasibility Randomized Controlled Trial**. *Contemporary Clinical Trials*, 123, p.106993, 2022.

• Kwan ML, Cheng RK, Iribarren C, **Shen H** *et al.* **Risk of Heart Failure with Preserved versus Reduced Ejection Fraction in Women with Breast Cancer**. *Breast Cancer Research and Treatment*, 1-7, 2022.

• Marín-Chollom AM, Hale C, Koch P, Gaffney AO, Contento I, **Shen H** *et al.* **Cognitive Functioning and Health in Hispanic/Latina Breast Cancer Survivors**. *Journal of Immigrant and Minority Health*, 1-8, 2021.

• Zakeri K *et al.* (including **Shen H**). **Predictive Classifier for Intensive Treatment of Head and Neck Cancer**. *Cancer*, 126(24), 5263-5273, 2020.

• **Shen H**, Jeong JH, Mell LK. **Proportional Relative Hazards Model for Competing Risks Data**. *medRxiv*, 2020.

• Vitzthum LK, Park H, Zakeri K, Bryant AK, Feng C, **Shen H** *et al.* **Selection of Head and Neck Cancer Patients for Intensive Therapy**. *International Journal of Radiation Oncology* Biology* Physics*, 106(1), 157-166, 2020.

• Mell LK, **Shen H** *et al.* **Nomogram to Predict the Benefit of Intensive Treatment for Locoregionally Advanced Head and Neck Cancer**. *Clinical Cancer Research*, 25(23), 7078-7088, 2019.

• Park A, Alabaster A, **Shen H** *et al.* **Undertreatment of Women with Locoregionally Advanced Head and Neck Cancer**. *Cancer*, 125(17), 3033-3039, 2019.

• Green G, Kim E, Carmona R, **Shen H** *et al.* **Incidence of Long-Term Esophageal Dilation With Various Treatment Approaches in the Older Head and Neck Cancer Population**. *Frontiers in Oncology*, 8, 466, 2018.

• Zakeri K *et al.* (including **Shen H**). **Predictor of Effectiveness of Treatment Intensification on Overall Survival in Head and Neck Cancer (HNC)**. *Annals of Oncology*, 29, viii375-viii376, 2018.

• Vitzthum LK *et al.* (including **Shen H**). **Comparison of Comorbidity and Frailty Indices in Patients with Head and Neck Cancer Using an Online Tool**. *JCO Clinical Cancer Informatics*, 2, 1-9, 2018.

• Bryant AK, Vitzthum LK, Zakeri K, **Shen H** *et al.* **Prognostic Role of p16 in Non-oropharyngeal Head and Neck Cancer**. *International Journal of Radiation Oncology* Biology* Physics*, 100(5), 1319, 2018.

• Zakeri K, Panjwani N, Carmona R, **Shen H** *et al.* **Generalized Competing Event Models Can Reduce Cost and Duration of Cancer Clinical Trials**. *JCO Clinical Cancer Informatics*, 2, 1-12, 2018.

• Mell LK, Zhang Q, **Shen H** *et al.* **Generalized Competing Event Regression to Stratify Head and Neck Cancer Patients: Secondary Analysis of NRG Oncology RTOG 9003, 0129, and 0522**. *International Journal of Radiation Oncology* Biology* Physics*, 99(2), S236-S237, 2017.

• Vitzthum LK, Noticewala SS, Hines P, Zakeri K, Nguyen C, **Shen H** *et al.* **A Web-Based Tool to Compare Comorbidity Models and Geriatric Risk-Assessment in Head and Neck Cancer Patients**. *International Journal of Radiation Oncology* Biology* Physics*, 99(2), E379, 2017.

• Carmona R *et al.* (including **Shen H**) **Improved Method to Stratify Elderly Patients With Cancer at Risk for Competing Events**. *Journal of Clinical Oncology*, 34(11), 1270-1277, 2016.