Jacob Beal

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Computer Science Graduate Student | Software Engineer | Computer Vision & Healthcare AI

RESEARCH INTERESTS

AI for healthcare; deep learning; computer vision; multimodal learning; robust evaluation, generalization, and uncertainty in machine learning.

EDUCATION

Utah State University | Logan, UT | Aug 2026 - Expected Apr 2027

M.S. in Computer Science (Thesis Track) | GPA: 4.00/4.00 (completed coursework)

- Graduate coursework: Intelligent Systems, AI in Education; Advanced Algorithms, Large Language Models, and Vision-Language Models (in progress).
- Planned M.S. thesis research under Prof. Shah Hamdi: machine learning with NASA/NOAA time-series data to forecast solar flares and solar energetic particle events.

Utah State University | Logan, UT | Apr 2026

B.S. in Computer Science | GPA: 3.93/4.00 | Summa Cum Laude

- College of Science Dean's List (two-time recipient). Relevant coursework: Natural Language Processing, Linear Algebra, Statistics, Discrete Mathematics, Theory of Computability.

APPLIED MACHINE LEARNING & COMPUTER VISION

MyBreakPoint | Ongoing

Independent Computer Vision Research & Development | Sole Developer

Research portfolio: github.com/FroostySnoowman/mybreakpoint-vision-research

Technical report: Ball Tracking, Court Calibration and Point Segmentation for Amateur Tennis Video on a Phone (Nov 2026), jacobjbeal.com

- Designed and trained TrackNet-style ball tracking and court keypoint models in PyTorch, with homography estimation, geometric gating and single-camera court calibration; retraining on amateur footage raised court accuracy within 15 cm from 25.1% to 61.9% on a 10-video validation set.
- Developed a temporal point-segmentation model using ball detections, frame motion and audio. In four-fold cross-validation on 42 labeled videos (1,351 serve segments), it kept about 92% of points intact (91.9% to 92.4% across three training seeds, with decoding settings chosen without the scored fold) while removing about half of the dead time.
- Found and fixed three evaluation problems: validation leakage from overlapping video windows (rebuilt held-out clip and video splits), decoding settings tuned on the scored fold (94.2% corrected to 91.9%), and a frame-timing bug in a scoring script.
- Tested robustness to compression, resolution, frame rate and lighting: accuracy held across resolution and 25 fps but fell from 88.5% to 67.7% under heavy compression (CRF 36); documented approaches that didn't help, including distillation, model averaging, track smoothing and training on compressed video.
- Evaluated ball tracking on seven held-out videos: 87.9% of visible-ball frames (218 of 248) located within 8 pixels; integrated mobile inference with Core ML (iOS) and ONNX (Android).

PROFESSIONAL EXPERIENCE

Amazon Ads | Seattle, WA | Jun 2026 - Aug 2026

Software Development Engineer Intern

- Developed campaign-level randomized experimentation support for a latency-sensitive advertising bidding system, enabling a class of experiments previously unsupported on the bid path.
- Built a pre-computation pipeline and versioned campaign-to-treatment mappings so bidders can resolve assignments through fast in-memory lookups, while supporting auditable manual allocations.
- Implemented changes across experiment services, data pipelines, cloud storage, bidder client code, and self-service UI; validated the manual workflow end to end in the beta environment.

Break Point Technologies, LLC | Dec 2024 - Present

Co-Founder & Sole Software Engineer

- Independently architected and developed MyBreakPoint, a live scoring, analytics, and team platform for eight racket sports across iOS, Android, the web, Apple Watch, and Wear OS.
- Built real-time scoring, advanced match statistics, team communication, offline-first synchronization, video streaming, recordings, and match-aligned score overlays.
- Shipped on-device tennis ball/court tracking and automatic highlights; developed AI coaching grounded in match statistics and continued prototyping single-camera video analysis.

Craft Down Under | Feb 2023 - Present

Software Developer

- Built internal automation that reduced support workload by approximately 75%, plus backend services, APIs, and database integrations for a community of 300,000+ users.

Utah State University | Logan, UT | Aug 2023 - Jun 2026

IT Service Desk Support

- Resolved hardware, software, network, and account issues for students, faculty, and staff; explained technical solutions to users with varied experience.

LEADERSHIP

Utah State University Club Tennis | 2026 - Present

Team Captain

- Coordinate practices and competitive activities, support new members, and collaborate with club officers and campus staff.

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, Java, SQL

Machine Learning: PyTorch, OpenCV, model training and evaluation, temporal models, Core ML, ONNX

Development & Infrastructure: React Native, Expo, React, Node.js, Cloudflare Workers/D1/Durable Objects, AWS, Git, Linux