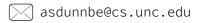
Andrea Dunn Beltran

Graduate Student



asdunnbe.github.io

im andrea-dunn-beltran





EDUCATION

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

Spring 2024 - Present | Chapel Hill, NC

MASTER OF SCIENCE IN COMPUTER SCIENCE

Relevant Coursework: Artificial Intelligence; 3D Generative Models; Visual Recognition with Transformers; Computational Biology; Mobile Health Systems; Deep Learning; Robot Learning

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

Fall 2020 - Fall 2023 | Chapel Hill, NC

BACHELOR OF SCIENCE IN COMPUTER SCIENCE & APPLIED MATHEMATICS

Relevant Coursework: Algorithms and Analysis; Machine Learning; Neural Rendering; Probabilistic Models and Deep Structured Prediction; 3D Computer Vision; Optimization for Machine Learning; Introduction to Probability

PUBLICATIONS

- → NFL-BA: Improving Endoscopic SLAM with Near-Field Light Bundle Adjustment, Andrea Dunn Beltran, Daniel Rho, Marc Niethammer & Roni Sengupta. Under review (arXiv 2025).
- → PPS-Ctrl: Controllable Sim-to-Real Translation for Colonoscopy Depth Estimation, Xinqi (Ana) Xiong, Andrea Dunn Beltran, Jun Myeong Choi, Marc Niethammer & Roni Sengupta. Under review (arXiv 2025).
- → VIN-NBV: A View Introspection Network for Next-Best-View Selection for Resource-Efficient 3D Reconstruction, Noah Frahm, Dongxu Zhao*, Andrea Dunn Beltran*, Ron Alterovitz, Jan-Michael Frahm, Junier Oliva & Roni Sengupta. Under review (arXiv 2025).
- → Modulation of tau tubulin kinases (TTBK1 and TTBK2) impacts ciliogenesis, Frances Bashore, Ariana Marquez, Apirat Chaikuad, Stefanie Howell, Andrea Dunn, Álvaro Beltran, Jeffery Smith, David Drewry, Adriana Beltran & Alison Axtman. Scientific Reports, 2023.

RESEARCH EXPERIENCE

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL | RESEARCH ASSISTANT Next-gen 3D Modeling of Endoscopy Videos

Spring 2023 – Present | Chapel Hill, NC

- → Lead (4D Bronchoscopies): Designed synthetic breathing-lung dataset generation pipeline and reconstruction pipeline.
- → Lead (NFL-BA): Augmented dense SLAM by integrating near-field lighting cues into the bundle adjustment objective and achieving state-of-the-art results on the C3VD dataset.
- → 2nd Author: PPS-Ctrl: Contributed to the evaluation pipeline for Stable Diffusion + ControlNet conditioned on Per-Pixel Shading, producing more photorealistic sim-to-real colonoscopy translations and depth estimation.
- → UG contributor: Assisted data cleaning & analysis of preliminary algorithms leveraging optical flow and reflectance cues.

Task-Aware 3D Knowledge Acquisition

- → 2nd Author (VIN-NBV): Supported development and baseline implementation of a View Introspection Network for next-best-view selection, improving reconstruction quality by 30%; Aided evaluation efforts.
- → **UG contributor**: Conducted literature review and designed data preparation and evaluation pipelines.

UNIVERSITY OF SOUTHERN CALIFORNIA | UNDERGRADUATE RESEARCH ASSISTANT

Summer 2023 | Los Angeles, CA

NSF REU: Robotics and Autonomous Systems — RL with Temporal-Logic Constraints on the Toyota HSR

- → Explored single-agent reinforcement learning with temporal-logic specifications on the Toyota Human Support Robot (HSR) platform.
- → Built Python-based Gazebo and OpenAl Gym environments for RL training and developed data-collection pipelines for imitation learning; presented results at the SoCal REU Symposium.

^{*} indicates equal contribution

REU: Data Science — Online Learning for Multi-Label Medical Imaging

- → Built an online-streaming pipeline and custom TensorFlow CNNs to address class-imbalanced chest X-ray datasets.
- → Conducted ablation studies on learning-rate schedulers and indexing schemes to mitigate catastrophic forgetting.
- → Automated data augmentation and continual-learning workflows; presented findings at the Rice REU Symposium.

UNC STEM CELL CORE FACILITY | INTERN

Fall 2021 - Spring 2022 | Chapel Hill, NC

Modulation of tau tubulin kinases (TTBK1 and TTBK2) impacts ciliogenesis

- → Stained and imaged over 200 cilia per month using immunofluorescence and high-resolution microscopy.
- → Developed ImageJ macros and a Python-based segmentation pipeline to automate cilia count and length measurements, reducing analysis time by 80%.
- → Results featured in a Scientific Reports publication.

UNC DEPARTMENT OF PHARMACOLOGY | INTERN

Summer 2018, Summer 2019, Fall 2020 - Spring 2021 | Chapel Hill, NC

Gary L. Johnson Lab

- → Assisted with dose-response and viability assays on TNBC cell lines, confirming apoptosis via caspase-3 cleavage.
- → Gained proficiency in sterile cell culture, Western blotting, gel electrophoresis, plasmid mini/maxi-prep, bacterial transformation, and fluorescence microscopy.
- → Generated data supporting a BRCA2-mutation study publication.

TEACHING

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

Chapel Hill, NC

GRADUATE TEACHING ASSISTANT

- → COMP 776: Computer Vision in the 3D World (Lead. Fall 2023, Fall 2024, Fall 2025): Supported instructor in class prep, authored solution manuals, and led weekly office hours sections.
- → COMP 116: Scientific Programming (Lead. Spring 2024): Designed lesson plans and review guides for 110+ students; restructured grading system to improve fairness and efficiency.

Undergraduate Teaching Assistant

→ APPL 101: Intro to Engineering (Fall 2022): Created MATLAB lesson plans for the needs of a class of over 60 students with varying programming experiences.

SKILLS & ACHIEVEMENTS

PROGRAMMING LANGUAGES Python • MATLAB • C • Java • JavaScript • SQL • R • MIPS • HTML

SOFTWARE & TOOLS LaTeX • Linux/Unix • Git • Docker • CUDA • Blender • 3DSlicer • ImageJ • VTK/ITK

ML & DATA PyTorch • TensorFlow • OpenCV • NumPy • ROS • Pandas • Open3D • Scikit-Learn • Matplotlib • OpenAl Gym

AWARDS & HONORS CVPR BP Scholarship (2025) • CVPR DEI Scholarship (2024) • Dean's List (2021-2023) • Hayden B. Renwick Scholar (2021-2023)

OUTREACH & COMMUNITY

MENTORSHIP MIT Summer Geometry Initiative Mentor: SLAM • UNC-Intel REU Mentor: Deep-Fake Detectors • Graduate Women in CS Mentor • Mentored new undergraduates in the lab

ADMINISTRATION UNC Dept. of Applied Sciences & Engineering Program Committee Member • UNC Dept. of Computer Science DEI Ambassador (undergraduate) • UNC Dept. of Computer Science Student Association Officer (graduate)

COMMUNITY & CLUBS (Graduate) Women in Computer Science • Afro-Latinx Vice President • CS+SG

PROFESSIONAL AFFILIATIONS SACNAS • CVF • LatinX in Al