BIOGRAPHICAL SKETCH

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NAME: Richards, Zachary

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Resident Physician

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	START DATE MM/YYYY	COMPLETION DATE MM/YYYY	FIELD OF STUDY
University of Iowa, Iowa City, Iowa	Resident	07/2023	06/2027	Ophthalmology
Texas A&M University, Houston, Texas	MD	05/2019	05/2023	Medicine
Texas A&M University, Houston, Texas	MENG	05/2019	05/2023	Interdisciplinary Engineering
Texas A&M University, College Station, Texas	BS	08/2015	05/2019	Biomedical Engineering

A. Personal Statement

As a developing surgeon-innovator with advanced training in medical device development, I am drawn to unmet needs in ophthalmology and in ophthalmic education. While effective and compassionate clinical practice is my chief goal, I believe that my ability to teach and innovate will come to define my career. I have had the great pleasure of being a trainee for a long time, in one form or another. Being an ophthalmology resident at an academic institution that passionately values its learners has no doubt been my favorite chapter. There is something deeply transformative about growing in skill and trust with our faculty. Conversely, some of my most rewarding moments of training have been helping a junior resident grasp a diagnosis or refine their skills. Transitioning into chief year and fellowship and beyond, I hope my career keeps me on both sides of mentorship. Academic ophthalmology creates a real space for innovation in technique, teaching, and technology. I am not a traditional researcher, in the basic or clinical sense, but I have a passion for creating technical solutions to problems that I find. The most recent and most notable of these is a stereo recording module which I have developed for the operating microscope. Stereo surgical videos are incredibly immersive and help build depth cues, yet they are relatively scarce. My department is known for its educational resources, but we lacked the ability to record cases this way. I created a device and method to inexpensively record ophthalmic surgery in stereo to address this content gap. With incredible support from faculty, we built a prototype and have been recording surgeries for a VR cataract surgery curriculum. My institution's support for this work has been pivotal, and I have come to appreciate how an academic innovation ecosystem fosters projects that make an impact without necessarily reaching journals or commercializing. I look forward to applying for vitreoretinal surgery fellowship this summer, most of all for the privilege of helping patients overcome and live with their retina problems. The surgical, biologic, and cellular technology driving this field continues to blossom. My goals are to become a skillful vitreoretinal surgeon, teach that skill, and make surgery more effective through innovation in instrumentation and fellow education.

B. Positions and Honors

Positions and Scientific Appointments

2023 - Resident Physician, University of Iowa, Iowa City, Iowa

Honors

2025 - 2026	Innovation Leadership Fellow, University of Iowa
2019 - 2023	Full Tuition Scholarship, Texas A&M School of Engineering Medicine
2019 - 2023	Class Executive Officer, Texas A&M School of Engineering Medicine
2015 - 2019	Craig and Galen Brown Foundation Scholar, Texas A&M University
2023	Outstanding Medical Student in General Surgery, Texas A&M School of Medicine
2023	Graduation with Honors, Texas A&M School of Medicine
2022	Inductee, Alpha Omega Alpha Honor Medical Society
2022	Outstanding EnMed Capstone Project, Texas A&M/Houston Methodist Hospital
2018	Outstanding Senior Engineer Award, Texas A&M University

C. Contribution to Science

1. Learning and teaching eye surgery requires a fine appreciation of depth, which is aided intraoperatively with binocular stereo microscopy. Stereoscopic videos convey similar depth information. I have developed a recording system for operating microscopes to capture eye surgery in stereoscopic 3D. My working prototype creates VR-ready videos at a far lower cost than 3D visualization systems currently on the market. In the near term, our team will curate a virtual reality cataract surgery curriculum and expand the EyeRounds.org video atlas. My vision is to set a new standard for how we capture and review surgical video in ophthalmology.
2. I led a team of medical students and engineers to develop a slit lamp microscope more accommodating of patients with obesity and large chests. We used a motorized, suspended design in a proof of concept and institutionally disclosed the invention.
3. Mentorship under Dr. Andrew G. Lee, case reports and EyeWiki contributions
    a. Marsh HD, Richards ZI, Laylani NA, Dávila Siliezar PA, Mortensen PW, Lee AG. Simultaneous Fulminant Intracranial and Systemic Hypertension. J Neuroophthalmol. 2024 Sep 1;44(3):e353-e355. PubMed PMID: 39164901.
    b. Richards ZI, Laylani NA, Dávila Siliezar PA, Lee AG. "Tilt-Shift" Perception as a Presentation of Alice in Wonderland-like Syndrome. J Neuroophthalmol. 2024 Mar 1;44(1):e157-e158. PubMed PMID: 36603137.
    c. Richards,Zachary,I, Aldred,M,, Marsh,H,, Laylani,N,, Davila Siliezar,P,, Mortensen,P,, Lee,A,G, Al-Zubidi,N,. Foville Syndrome. [Internet]. EyeWiki; 2022. Available from: https://eyewiki.org/Foville_Syndrome
    d. Wotipka,E,, Ziari,M,, Richards,Z,, Davila Siliezar,P,, Laylani,N,, Lee,A,G. Congenital Cranial Dysinnervation Disorders. [Internet]. EyeWiki; 2022. Available from: https://eyewiki.org/Congenital_Cranial_Dysinnervation_Disorders
4. I contributed to analysis and manuscript composition for a retrospective study assessing visual and surgical outcomes of scleral buckling with and without pars plana vitrectomy in patients with retinal detachment and Stickler syndrome.
    a. Taylor K, Su M, Richards Z, Mamawalla M, Rao P, Chang E. Outcomes in Retinal Detachment Repair and Laser Prophylaxis for Syndromes with Optically Empty Vitreous. Ophthalmology Retina. 2023 October; 7(10):848-856. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2468653023002804 DOI: 10.1016/j.oret.2023.06.012
5. I co-developed and tested a printable biomaterial intended for custom implants for patients with craniofacial skeletal defects. My role was to assess printability, cell viability, and osteoblastic gene expression of induced pluripotent stem cells cultured on test grafts.
    a. Sears C, Mondragon E, Richards ZI, Sears N, Chimene D, McNeill EP, Gregory CA, Gaharwar AK, Kaunas R. Conditioning of 3D Printed Nanoengineered Ionic-Covalent Entanglement Scaffolds with iP-hMSCs Derived Matrix. Adv Healthc Mater. 2020 Aug;9(15):e1901580. PubMed Central PMCID: PMC7500865.

D. Scholastic Performance

Scholastic Performance

YEAR	COURSE TITLE	GRADE
	TEXAS A&M UNIVERSITY	
2023	Cumulative GPA	3.7
2023	Class Rank	5th
	TEXAS A&M UNIVERSITY	
2023	Cumulative GPA	4.0
	TEXAS A&M UNIVERSITY	
2019	Cumulative GPA	4.0