

**THOMAS KNAPP | GRADUATE STUDENT**  
UNIVERSITY OF ARIZONA | DEPARTMENT OF BIOMEDICAL ENGINEERING

## PERSONAL

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## EDUCATION

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2025 (anticipated)                    **Doctor of Philosophy**  
*Biomedical Engineering*  
The University of Arizona, Tucson, Arizona, USA.  
Supervisor(s): Dr. Travis William Sawyer, PhD.

2017                                        **Bachelors of Science**  
*Physiology*  
The University of Arizona, Tucson, Arizona, USA.

## PROFESSIONAL EXPERIENCE

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2022 – present    **Postdoctoral Affairs Media Manager**  
*Postdoctoral Affairs | University of Arizona*

- Interview and create written and/or video pieces of current and previous postdocs at the U of A
- Curate social media accounts for the Postdoctoral Affairs group to disseminate information to the postdoc community, including upcoming events, funding opportunities, and work/achievements of their colleagues

2022 – present    **STAR Lab Coordinator**  
*SARSEF | University of Arizona*

- Manage STAR lab at the U of A, ensuring KEYS students apply safe and proper technique while performing wet lab experiments.
- Provide miscellaneous support to SARSEF program coordinators, KEYS students and their lab managers.

2021 – present    **Graduate Research Assistant**  
*Biomedical Optics and Optical Measurements Laboratory | University of Arizona. [Link](#)*

- Research on optical biomarkers of cancer with advanced imaging techniques.
- Mentor of undergraduate students conducting imaging and programming projects.
- Support role for other graduate research projects.
- Provision of routine progress updates to supervisor and collaborating researchers.

2019 – 2020

**Research Technician***Hand Research Lab | University of Arizona, Department of Orthopedics*

- Set up and organization of lab equipment for newly established lab space.
- Protocol and standards review per University of Arizona policies.
- Early experimentation of modeling wrist soft tissue using ultrasound imaging.
- Communication with vendors for the purchase and proper set up of research equipment.

2018 – 2019

**Research Technician***Trauma Surgery Research Group | University of Arizona, Department of Surgery*

- Overnight monitoring of incoming trauma patients, collection of study specimens
- Recruitment and documentation of patients into several ongoing studies
- Database management and documentation review for proper protocol adherence

**EDUCATION / MENTORSHIP EXPERIENCE**

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2022

KEYS Summer Internship mentoring program

- Guided a high school KEYS intern through research project that entailed quantification, modeling, and machine-learning classification of multi-photon images.

**PATENTS**

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1. Co-owner “Self-Calibrating Spectrometer with Adjustable Spectral Resolution and Spectral Range” Patent US 63/243,038 Pending (Filed September 10, 2021)
2. Co-owner “Advanced Spectroscopy using a Camera of a Personal Device” Patent US 63/243,034 Pending (Filed September 10, 2021).

**HONOURS AND AWARDS**

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2021-23

Computational and Mathematical Modeling of Biological Systems NIH Training Fellowship GM132008, Fellowship lead: Dr. Timothy Secomb, PhD.

2022

First place poster presentation – Department of Biomedical Engineering Research Expo, University of Arizona

2017

Academic Year Highest Academic Distinction, University of Arizona

**RESEARCH/SCHOLARSHIP**

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ResearchGate: <https://www.researchgate.net/profile/Tom-Knapp>**INTERESTS**

1. Development of advanced imaging systems and automated detection platforms to improve minimally invasive diagnosis and treatment of cancer.
2. Measurement and modeling of endogenous tissue fluorescence for the development of algorithms that can be used for label-free diagnostics / screening.
3. Low-cost alternatives to current technology to address health disparities linked to lack of equipment access.

LAB ROTATIONS/ASSISTANCE

Tenure	Lab	Supervisor	Project(s)
2020-21	Multi-scale Brain Imaging Lab, University of Arizona	Dr. Elizabeth Hutchinson	Murine surgery for implantation of cranial window towards multiphoton imaging of superficial brain tissue.  Processing of ferret brain MR images, generation and analysis of microstructural MR maps.

RESEARCH MODALITY EXPERIENCE

Imaging	Software	Applied
Multi-photon microscopy (MPM)	Python	Image registration / artifact correction
Fluorescence microscopy (confocal/MPM)	R / RStudio	Image analysis
Optical coherence tomography (OCT)	SolidWorks	Murine surgery
Polarized light imaging (PLI)	MATLAB	Organoid culturing / transfer
Differential interference contrast (DCI) / phase contrast microscopy	ImageJ	3D modeling / printing
	C++	Machining / fabrication

JOURNAL - SUBMITTED

**T. Knapp**, S. Duan, J. L. Merchant, T. W. Sawyer

Quantitative Characterization of Duodenal Gastrinoma Autofluorescence using Multi-photon Microscopy bioRxiv 2022.05.19.492747; doi: <https://doi.org/10.1101/2022.05.19.492747> (pre-print)

JOURNAL - IN PREPARATION

1. **T. Knapp**, N. Lima, S. Duan, J. L. Merchant, T. W. Sawyer. "Evaluation of tile artifact correction methods for multiphoton microscopy mosaics using endogenous contrast"
2. J. Bonaventura, **T. Knapp**, J. Koshel, T. W. Sawyer. "Smartphone spectroscopy for melanoma detection"
3. B. Slomka, H.Song, R. Sontz, **T. Knapp**, J. L. Merchant, T. W. Sawyer. "Evaluation of analysis methods for label-free 3D OCT of colon cancer polyps"

CONFERENCES & PRESENTATIONS

1. **T. Knapp**, S. Duan, J. L. Merchant, T. W. Sawyer. "Characterizing the optical fingerprint of duodenal gastrinoma with quantitative multi-photon autofluorescence microscopy" Digestive Disease Week, San Diego CA, May 22, 2022 [Poster]
2. **T. Knapp**, S. Duan, J. L. Merchant, T. W. Sawyer. "Characterizing the optical fingerprint of duodenal gastrinoma with quantitative multi-photon autofluorescence microscopy" BIO5 Research to Innovation Showcase, Tucson AZ, April 21, 2022 [Poster]
3. **T. Knapp**, S. Duan, J. L. Merchant, T. W. Sawyer. "Characterizing the optical fingerprint of duodenal gastrinoma with quantitative multi-photon autofluorescence microscopy" University of Arizona Department of Biomedical Engineering 2021 Biomedical Engineering Research Exposition, Tucson AZ, March 23<sup>rd</sup>, 2022 [Poster]
4. **T. Knapp**, N. Lima, S. Duan, J. L. Merchant, T. W. Sawyer. "Evaluation of tile artifact correction methods for multiphoton microscopy mosaics of whole-slide tissue sections" SPIE Photonics West 2022, Conference on Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIX. Jan. 27, 2022 [Presentation]
5. **T. Knapp**, E. Hutchinson. "Microstructural MRI", University of Arizona Department of Biomedical Engineering Research Seminar. February 8<sup>th</sup>, 2021 [Presentation]
6. **T. Knapp**, E. Hutchinson. "Comparing Quantitative Microstructural MRI Maps in Ex-Vivo Ferret Traumatic Brain Injury Model", University of Arizona Department of Biomedical Engineering 2021 Biomedical Engineering Research Exposition, Tucson AZ, March 31<sup>st</sup>, 2021 [Poster]

CONFERENCES ATTENDED

1. Digestive Disease Week 2022, San Diego CA, May 21-24, 2022
2. SPIE Photonics West 2022, San Francisco CA, Jan. 22-27, 2022
3. The National Conference on Wilderness Medicine, Sante Fe NM, May 30-June 3, 2018

**GRANTS**

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TRAVEL GRANTS

Agency	Amount	Tenure	Location	Purpose
SPIE Student Support	USD: 700	2022	San Francisco, CA	Photonics West conference
NIH grant GM132008	USD: 869	2022	San Diego, CA	Digestive Disease Week conference
University of Arizona Cancer Center's Office for Cancer Research Training & Education Coordination (CRTEC)	USD: 925	2022	Tucson, AZ	NIH Grant Writing Boot Camp registration

**PROFESSIONAL SERVICE**

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PROFESSIONAL ASSOCIATIONS

- 2021 - Present American Gastroenterology Association, Student member  
 2021 - Present Biomedical Engineering Society, Student member  
 2021 - Present SPIE, Member

COMMITTEES – UNIVERSITY OF ARIZONA

- 2022 – 2023 Membership Committee, Biomedical Engineering Society (BMES)  
 2022 – 2023 Graduate Recruitment Committee, Department of Biomedical Engineering  
 2021 - 2022 Graduate Student Social Committee, Department of Biomedical Engineering

**WORKSHOPS/TRAINING/OTHER QUALIFICATIONS**

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- 2022 **Columbia University NIH Grant Writing Boot Camp**, *Virtual Attendance*  
 2022 **Eureka Institute Translational Medicine Certification course**, *University of Arizona, Tucson, AZ*  
 2022 **NSF I-Corps, Tech Launch Arizona**, *University of Arizona, Tucson, AZ*  
 2021 **Laser Radiation Protection**, *CITI*  
 2020 **Columbia University Machine Learning Boot Camp**, *Virtual Attendance*  
 2020 **Entrepreneurship for Biomedicine**, *Washington University, St. Louis, MO*

**COMMUNITY OUTREACH/SERVICE**

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- 2022 **College of Optical Sciences PreK Outreach** – Volunteer/organizer/demonstrator  
 2022 **Habitat for Humanity Central AZ Home Construction Project** - Volunteer  
 2022 **City of Tucson Earth Day Cleanup** - Volunteer  
 2022 **Wyant College of Optical Sciences, Laser Fun Day** - Volunteer  
 2022 **Cyclovia Tucson, Living Streets Alliance** - Volunteer  
 2022 **Junior Science and Humanities Symposium (JSHS)** - Judge  
 2022 **Southern Arizona Research, Science and Engineering Foundation (SARSEF) Fair (High School 9-12)** - Judge  
 2021 – Present **Tucson Clean & Beautiful / Tucson City Neighborhood tree planting Initiative** - Volunteer (recurring)

## REFERENCES

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Dr. Travis W. Sawyer  
University of Arizona, Wyant College of Optical Sciences  
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