

ANDREW S. CALE, M.S.

CURRICULUM VITAE

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EDUCATION

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| PhD | Anatomy, Cell Biology, and Physiology (Education Track)
Education and Communicating Science Minors
Indiana University School of Medicine – Indianapolis (IUSM)
<i>Mentor:</i> Dr. Margaret McNulty, PhD
<i>Dissertation:</i> “Metacognition in Anatomical Sciences Education” | Expected 2023 |
| MS | Modern Human Anatomy (MHA)
Certificate in Anatomical Sciences Education
University of Colorado Anschutz Medical Campus
<i>Mentor:</i> Dr. Danielle Royer, PhD
<i>Thesis:</i> “Gross Anatomy Review Course for Anesthesiology Residents on the Acute Pain Service: How Basic Science Training Can Improve Knowledge and Confidence” | 2018 |
| BS | Neurobiology, Physiology, and Behavior
University of California, Davis (UCD) | 2013 |

ACADEMIC APPOINTMENTS

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| Associate Instructor – PhD Student
Indiana University School of Medicine - Indianapolis | 8/2019 – Present |
| Adjunct Instructor
Rueckert-Hartman College for Health Professions, Regis University | 7/2018 – 12/2018 |

AWARDS AND RECOGNITIONS

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| 2023 | IU Lieber Memorial Associate Instructor Award (<i>nominee, winner still pending</i>) |
| 2022 | American Association for Anatomy Student/Postdoctoral Education Research Poster Award (\$500 awarded, \$250 travel reimbursement)
IUPUI Graduate and Professional Education Travel Grant (<i>competitive, \$500 awarded</i>)
IUSM Graduate Student Travel Award (<i>competitive, \$1000 awarded</i>) |
| 2021 | IUPUI Sherry Queener Graduate Student Excellence Award (<i>nominee, \$100 awarded</i>)
IU David B. Burr Educational Fellowship in Anatomical Education (\$250 awarded) |
| 2019 | IUSM Graduate Student Travel Award (<i>competitive, \$700 awarded</i>)
IUPUI Graduate and Professional Education Travel Grant (<i>competitive, \$500 awarded</i>) |
| 2018 | MHA Excellence in Teaching Award
MHA Excellence in Service Award (<i>nominee</i>) |

TEACHING

Teaching Experiences

Indiana University School of Medicine (IUSM)		
Title	Description and Responsibilities	Year
MEDX 620 Human Structure	Role: Associate Instructor Population: Medical students (n=150/semester) This team-taught course introduces students to the fundamental concepts and structures of human gross anatomy, embryology, and histology using lectures, human cadaveric dissection, and small group activities. My responsibilities included lecturing (n=1), laboratory instruction, exam set-up, and grading.	2020, 2022
ANAT D528 Gross Anatomy for Healthcare Professionals	Role: Associate Instructor Population: Allied Health students (n=130/semester) This team-taught course introduces students to the fundamental concepts and structures of human gross anatomy using lectures, human cadaveric dissection, and team-based learning (TBL) sessions. My responsibilities included lecturing (n=1), laboratory instruction, TBL facilitation, exam set-up, and grading.	2020-2022
ANAT D502 Basic Histology	Role: Associate Instructor Population: Graduate students (n=48/semester) This flipped course introduces students to the fundamental concepts and structures of histology using team-based learning (TBL) and virtual microscopy. My responsibilities included laboratory instruction and TBL facilitation.	2021
MEDX 660 Neuroscience and Behavior	Role: Associate Instructor Population: Medical students (n=150/semester) This team-taught course introduces students to the fundamental concepts and structures of neuroanatomy, neurophysiology, and neuropathology using lectures, laboratory sessions, and team-based learning (TBL). My responsibilities included laboratory instruction and TBL facilitation.	2021
ANAT D527 Neuroanatomy: Contemporary and Translational	Role: Associate Instructor Population: Graduate students (n=40/semester) This team-taught course introduces students to the fundamental concepts and structures of neuroanatomy and neurophysiology using lectures and laboratory sessions. My responsibilities included lecturing (n=1), laboratory instruction, exam set-up, and grading.	2021
MEDX 755 Endocrine, Reproduction, Musculoskeletal and Dermatology	Role: Associate Instructor Population: Medical students (n=150/semester) This team-taught course introduces students to the physiology and pathophysiology of the endocrine, reproductive, musculoskeletal and dermatologic systems using lectures and team-based learning (TBL) sessions. My responsibilities included TBL facilitation.	2021
ANAT D501 Human Gross Anatomy	Role: Associate Instructor Population: Graduate students (n=50/semester) This team-taught course introduces students to the fundamental concepts and structures of human gross anatomy using lectures and	2020

human cadaveric dissection. My responsibilities included lecturing (n=5), laboratory instruction, exam set-up, and grading.

Regis University		
Title	Description and Responsibilities	Year
HES 374 Applied Human Anatomy	Role: Course Director and Sole Instructor Population: Undergraduate students (n=40/semester) This course introduces students to the fundamental concepts and structures of human anatomy and physiology using lectures and human cadaveric prosections. My responsibilities included day-to-day course administration, all lecturing (n=34), exam creation (n=4), and grading.	2019

University of Colorado Anschutz Medical Campus		
Title	Description and Responsibilities	Year
DPTR 5001 Clinical Anatomy I	Role: Lab Tutor Population: Allied Health students (n=120/semester) This course introduces students to the fundamental concepts and structures of human gross anatomy using lectures and human cadaveric dissection. My responsibilities included supplemental laboratory instruction for struggling students.	2019
ANAT 6111/ANMS 5007 Human Gross Anatomy	Role: Teaching Assistant and Lecturer Population: Graduate and Anesthesiology Assistant students (n=50/semester) This team-taught course introduces students to the fundamental concepts and structures of human gross anatomy using lectures, human cadaveric dissection, and ultrasound imaging. My responsibilities included lecturing (n=1), laboratory instruction, review session creation (n=1), exam set-up, and grading.	2018
Human Body Block	Role: Ultrasound Teaching Assistant and Lab Tutor Population: Medical students (n=120/semester) This team-taught course introduces students to the fundamental concepts and structures of human gross anatomy, embryology, and histology using lectures, human cadaveric dissection, ultrasound imaging, and small group activities. My responsibilities included instruction of ultrasound imaging and supplemental laboratory instruction for struggling students.	2017

University of California, Davis		
Title	Description and Responsibilities	Year
CHA 101L Human Gross Anatomy	Role: Teaching Assistant Population: Undergraduate students (n=50/lab section, 500/lecture section) This course introduces students to the fundamental concepts and structures of human gross anatomy using lectures and human cadaveric prosections. My responsibilities included laboratory instruction in my scheduled lab section, office hours, and in open-lab (designated times when any of the 500 students could come to the laboratory), quiz set-up, and quiz grading.	2014-2016

Continuing Education		
Title	Description and Responsibilities	Year

ANESTH Cadaver Review Session	Role: Sole Instructor and Prosector Population: Anesthesiology Residents and Fellows (n=10/session) This monthly two-hour cadaver review session reintroduces gross anatomy concepts relevant to peripheral nerve blocks to improve the gross anatomy knowledge and regional anesthesia performance of residents from the IUSM Department of Anesthesia. *This is a continuation of the ANESTH Cadaver Review Sessions originally piloted at the University of Colorado Hospital. The curriculum has been updated and tailored to better meet the needs of the IUSM resident population.	2021-Present
Teaching, Learning, and Professor Support for Graduate Teaching Assistants	Role: Co-Course Director Population: Graduate students (n=12/session) This annual two-day training was designed to prepare IUSM graduate students for their responsibilities as teaching assistants by providing them with pedagogical and technical skills. Topics were taught using Canvas LMS, Zoom, active learning strategies and included learner-centered teaching, goal setting, collaboration, planning teaching sessions, difficult scenarios, and providing feedback.	2021-2022
ANAT D528 Gross Anatomy Make-Up Labs	Role: Associate Instructor Population: Allied Health students (n=128/session) This continuing education series provides students who were unable to participate in gross anatomy labs due to COVID-19 with a condensed cadaver laboratory experience to supplement their existing anatomy education.	2021
ANESTH Cadaver Review Session	Role: Lab Instructor and Prosector Population: Anesthesiology Residents and Fellows (n=10/session) This monthly two-hour cadaver review session reintroduces gross anatomy concepts relevant to peripheral nerve blocks to improve the gross anatomy knowledge and regional anesthesia performance of residents from the University of Colorado Hospital.	2017-2019
K-12 and Public Outreach		
Title	Description and Responsibilities	Year
Anatomy Nights	Role: Presenter and Prosector This internationally coordinated outreach event brings the anatomical sciences to the public. Events include a brief presentation on the basics of heart or brain anatomy followed by a live dissection of an animal heart or brain to demonstrate the discussed structures.	2019-Present
IU Center for Anatomy and Physiology Education (CAPE) Lab Tours	Role: Lab Instructor This outreach event provides K-12 and college students with a hands-on human cadaver lab experience and introduces human gross anatomy and physiology using prosected human cadavers, isolated specimens, models, and bones.	2019-Present
Taste of Science Indianapolis	Role: Co-Organizer This nationally coordinated science communication series invites local scientists to speak about their research to a lay audience. Events featured brief presentations and interactive games for the audience.	2021

18th Annual Health Professions Consortium	<p>Role: Volunteer Educator and MHA Representative</p> <p>This career fair series involved tabling exhibits and promoting the anatomical sciences and the Modern Human Anatomy Program to 1000+ undergraduate students as well as pre-health career counselors at four universities across Oregon and Southwest Washington.</p>	2019
Community Brain Expo Day	<p>Role: Volunteer Educator and MHA Representative</p> <p>This outreach event promotes the anatomical sciences to the community members of Boulder, CO using plastinated organs, bones, anatomical models, and neuroscience demonstrations.</p>	2019
Wellness, Lifelong, and Career Orientation Mentoring (WeLL-COMe)	<p>Role: Lab Instructor</p> <p>This outreach event series involves teaching middle school students the gross anatomy and physiology of the human brain using plastinated and fresh brain specimens, cranial nerve exams, brain cross-sections and neuroscience demonstrations.</p>	2017-2019
Brain Awareness Week	<p>Role: Lab Instructor</p> <p>This outreach event involves teaching K-12 students the gross anatomy and physiology of the human brain using plastinated and fresh brain specimens, cranial nerve exams, brain cross-sections and neuroscience demonstrations.</p>	2017-2018
CO-Area Health Education Center (AHEC) Obesity Outreach Project	<p>Role: Lecturer and Lab Instructor</p> <p>This outreach event involves educating Colorado high school students about human anatomy and the health consequences of obesity using prosected human cadavers and harvested specimens.</p>	2017-2018
Camp Neuro	<p>Role: Lab Instructor</p> <p>This outreach event involves teaching high school students the gross anatomy and physiology of the human brain using plastinated and fresh brain specimens, cranial nerve exams, brain cross-sections and guided sheep brain dissections.</p>	2017
Miscellaneous Career Fairs	<p>Role: Volunteer Educator</p> <p>These outreach events involve promoting the anatomical sciences to K-12 students, college students, and the general public using plastinated organs, bones, anatomical models, and cadaver cross-sections.</p>	

Mentoring

High School Students

C. He Indiana University School of Medicine, McNulty Lab 2022
Project: Adapting *the Catch-Phrase Game for Gross Anatomy Education*

Undergraduate Students

C. Burton Indiana University School of Medicine, McNulty Lab 2021
Project: *Thematic Analysis of Remediating Medical Student Exam Reflections*

Enduring Instructional and Curriculum Materials

Anatomy Catch-Phrase Game

Role: Primary Developer

- An adaption of the Catch-Phrase game in which students try to get their teammates to guess an anatomical structure by describing its associated characteristics, functions, and relationships.

Active Lesson Digital Dissection Manual

Role: Contributor (Image Annotation)

- Customizable digital dissector that guides students through the dissection of a full human cadaver. Features include step-by-step instructions, annotated cadaveric images, and practice questions.

Anesthesiology Acute Pain Service Gross Anatomy Review Module

Role: Primary Developer

- Interactive PDF module designed to review the gross anatomy relevant to common peripheral nerve blocks performed by the University of Colorado Hospital Acute Pain Service, including major nerves, landmarks, dermatomes, myotomes, and associated structures.

Metacognition-Based Active Learning Review Session

Role: Primary Developer

- One-hour review session designed to introduce novice gross anatomy students in ANAT 6111/ANMS 5007 to metacognitive principles and educational strategies they can employ to succeed in the course.

RESEARCH

Refereed Publications

Cale AS, Byram JN, Organ JM, Schmalz NA. (2022). "A Whole New Perspective on How the Body Fits Together" - An Evaluation of a Cadaver Laboratory Experience for High School and Undergraduate Students. *Anat Sci Educ*. ***Accepted** (October 2022)

Cale AS, Hoffman LA, McNulty MA. (2022). Promoting metacognition in an allied health anatomy course. *Anat Sci Educ*. 00:1-13. <https://doi.org/10.1002/ase.2218>

Sanders KA, Philp JAC, Jordan CY, **Cale AS**, Cunningham CL, Organ JM. (2022) Anatomy Nights: An international public engagement event increases audience knowledge of brain anatomy. *PLOS ONE* 17(6): e0267550. <https://doi.org/10.1371/journal.pone.0267550>

Cale AS, Hendrickse A, Lyman M, Royer DF. (2020). Integrating a Cadaver Review Session into the Existing Regional Anesthesia Training for Anesthesiology Residents: An Initial Experience. *Med Sci Educ*. 20:695-703.

Conference Presentations

- 2022 **Cale AS**, McNulty MA. *An Exploration of Metacognitive Practices in Gross Anatomy Educators*. Philadelphia, PA, USA. The FASEB Journal, 36:S1.R2386.
***Finalist and Winner**; AAA/Anatomical Sciences Education Journal Student/Postdoc Education Research Poster Presentation Award
****Poster presentation at American Association for Anatomy Annual Meeting (Philadelphia, PA)**
- Cale AS**, McNulty MA, Hoffman LA. *Learning from the Past: A Five-Year Analysis of the Exam Preparations of Students Repeating an Integrated Medical Anatomy Course*. The FASEB Journal, 36:S1.R2467.
***Selected as one of 10 AAA posters to be featured during the Experimental Biology opening reception.**
****Poster presentation at American Association for Anatomy Annual Meeting (Philadelphia, PA)**
- Cale AS**, McNulty MA, Hoffman LA. *Expectation Rarely Matches Reality: A Five-Year Analysis of Anatomy Exam Score Predictions by First-Year Medical Students*.
****Poster presentation at Indiana University School of Medicine Education Day (Indianapolis, IN)**
****Poster presentation at American Association for Anatomy Regional Meeting (Virtual)**
- 2021 **Cale AS**, McNulty MA. *Realistic Implementation of Metacognitive Activities in an Allied Health Anatomy Course*. The FASEB Journal, 35:S1.01726.

***Finalist and Runner-Up;** AAA/Anatomical Sciences Education Journal Student/Postdoc Education Research Poster Presentation Award

******Poster presentation at American Association for Anatomy Annual Meeting (Virtual)

******Poster presentation at Indiana University School of Medicine Education Day (Virtual)

Cale AS, McNulty MA. *Metacognition in the Middle: Mismatch between Anticipated and Actual Exam Grades of Allied Health Anatomy Students*. The FASEB Journal, 35:S1.01742.

******Oral presentation at American Association for Anatomy Annual Meeting (Virtual)

******Poster presentation at Indiana University School of Medicine Education Day (Virtual)

2020 **Cale AS**, Byram J, Schmalz N. "A Whole New Perspective on How the Body Fits Together" – An Evaluation of a Cadaver Lab Experience for High School and Undergraduate Students. The FASEB Journal, 34:S1.03306.

******Poster presentation at American Association for Anatomy Annual Meeting (Virtual)

******Poster presentation at Indiana University School of Medicine Education Day (Indianapolis, IN)

Cale AS, Lee LMJ. Those Who Can't Do, Teach Anatomy? The Presence of Stereotype Threat in Anatomical Sciences Educators. The FASEB Journal, 34:S1.02344.

******Poster presentation at American Association for Anatomy Annual Meeting (Virtual)

2018 **Cale AS**, Hendrickse A, Lyman M, Royer D. *Gross Anatomy Review for Anesthesiology Residents on the Acute Pain Service: How Basic Science Training Could Improve Knowledge and Confidence*. The FASEB Journal, 32:504.9-504.9.

******Poster presentation at Modern Human Anatomy Capstone Presentations (Denver, CO)

******Poster presentation at American Association for Anatomy Annual Meeting (San Diego, CA)

******Poster presentation at AAMC Western Group on Educational Affairs Regional Meeting (Denver, CO)

******Oral presentation at CU Education Scholarship and Innovation Symposium (Denver, CO)

Media Appearances

2022 IUPUI Community for Open Research and Education. Science Communication and Open Scholarship [Webinar]. In *IUPUI Community for Open Research and Education Panel Series*. <https://ulib.iupui.edu/news/open-research-ed-2022>

American Association for Anatomy. Student Seminar: Apply to Graduate Programs in Anatomy [Webinar]. In *AAA Anatomy Webinar Series*. https://anatomy.org/AAA/Meetings-Events/Event_display.aspx?EventKey=GRADSCHOOL

American Society for Microbiology. How to Make Your Mark on the Association [Webinar]. In *Annual Biomedical Research Conference for Minoritized Students (ABRCMS) ePoster Spring Symposium for Emerging Scientists*.

2021 American Association for Anatomy. Student Seminar: How to Make Your Mark on the Association [Webinar]. In *AAA Anatomy Webinar Series*. <https://anatomy.org/AAA/Resources/Webinars-Folder/090921.aspx>

2020 Pickering J. (Host). Lockdown Special X (Ep. 111) [Audio podcast episode]. In *Anatomy Education Podcast*. <http://anatomypodcast.co.uk/episodes/lockdown-special-x/>

Pickering J. (Host). Lockdown Special IX (Ep. 109) [Audio podcast episode]. In *Anatomy Education Podcast*. <http://anatomypodcast.co.uk/episodes/lockdown-special-ix/>

UNIVERSITY, PROFESSIONAL, AND COMMUNITY SERVICE

Professional Memberships

2017-Present	American Association for Anatomy (AAA)
2020-Present	American Association of Clinical Anatomists (AACA)
2020-Present	International Association for Medical Science Educators (IAMSE)
2020-Present	Human Anatomy and Physiology Society (HAPS)

2022-Present American Association for the Advancement of Science (AAAS)

Professional Service

2017-Present American Association for Anatomy (AAA)
 2022-2025 Board of Directors (Student/Postdoc Director)
 Membership Task Force
 2019-2022 Ambassador Committee
 Social Media Subcommittee
Major Projects: Faces of Anatomy Profiles ([link](#)), #AnatChat Twitter Chats ([link](#))
 Events Subcommittee
Major Projects: Anat-O-Meet Bingo Game, Virtual Chat Rooms at Experimental Biology

University Service

2019-Present Master's in Modern Human Anatomy - Alumni Association (MHA-AA)
 Networking Coordinator
Major Projects: *The Plexus Post* triannual newsletter, Alumni Happy Hour/Game Nights, Career Networking Panel, Annual MHA Dinner at Experimental Biology
 2021 Taste of Science Indianapolis Planning Committee
 2019-2021 Student Outreach Community at IUSM (SOCl)
 2020-2021 Treasurer
Major Projects: Anatomy Nights

Non-Academic Publications

Cale, AS. (2022). On the Shoulders of Giants: One Scientist's Diabetes Research Journey. *PLOS SciComm Blog*. <https://scicomm.plos.org/2022/05/03/on-the-shoulders-of-giants-one-scientists-diabetes-research-journey/>

Cale, AS. (2020). Homeostasis at Home: 3(ish) Tips for Maintaining Your Optimal Work-Life Balance. *The Plexus Post – A Newsletter from the Modern Human Anatomy-Alumni Association*, 2(1). https://medschool.cuanschutz.edu/docs/librariesprovider157/default-document-library/the-plexus-post-oct-2020.pdf?sfvrsn=fa6a9fb9_2

Cale, AS. (2020). Confluence of Scientists: Five Tips for Your Next Scientific Conference. *The Plexus Post – A Newsletter from the Modern Human Anatomy-Alumni Association*, 1(2). https://medschool.cuanschutz.edu/docs/librariesprovider157/default-document-library/the-plexus-post-jan-2020e41f5e5302864d9a5bfff0a001ce385.pdf?sfvrsn=c1699fb9_2

Cale, AS. (2020). Synaptogenesis: Five Tips for Making New Networking Connections. *The Plexus Post – A Newsletter from the Modern Human Anatomy-Alumni Association*. 1(1). https://medschool.cuanschutz.edu/docs/librariesprovider157/default-document-library/the-plexus-post-sept-2019.pdf?sfvrsn=e0d78db9_2

PROFESSIONAL DEVELOPMENT AND SKILLS

Workshops, Trainings, and Courses

2022 *Teaching Foundations: Teaching Metacognitive Skills*
 Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis
Teaching Foundations: Using Formative Assessment to Check Students' Learning
 Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

Improving Course Accessibility: Create Inclusive Documents with Seven Simple Steps
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

Teaching Foundations: Designing your Course for Equity and Inclusion
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

Teaching Foundations: Inclusive Teaching Strategies
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

Emerging Scholars of College Instruction Program (2021 cohort)
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

2021 *MSCI M620: Pedagogical Methods in the Health Sciences*
Indiana University School of Medicine

Zoom and Top Hat for Interactive Meetings and Course Delivery
Educational Technology, Indiana University School of Medicine

An Introduction to Mixed Methods for Social Scientists
Academy of Teaching Scholars, Indiana University School of Medicine

Teaching@IUPUI: Writing a Teaching Philosophy/Statement
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

2020 *Teaching Portfolio Guide for Graduate Students and Postdocs*
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

Zoom Alchemy: Active Learning in the Virtual Classroom
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

Grad Students and Postdocs: Making the Most of Guest Lecturing Experiences
Center for Teaching and Learning, Indiana University-Purdue University, Indianapolis

2018 *ANAT 6490: Advanced Teaching in the Anatomical Sciences*
Modern Human Anatomy Program, University of Colorado Anschutz Medical Campus

Conflict Management Skills Workshop
Ombuds Office, University of Colorado Anschutz Medical Campus

Technical Skills

Learning Management Systems	Canvas, WorldClass, Exemplify
Qualitative Research Software	Dedoose, NVivo
Statistical Software	SPSS, Prism
Advanced Cadaver Dissection	Full-body human dissection, craniotomy, complete nervous system extraction
Histotechnology	Immunohistochemistry, H&E staining, frozen/paraffin-embedded sectioning
Programming Languages	MATLAB
Imaging and Modeling Software	ScanIP, Slicer
Publishing Software	Adobe InDesign, Articulate Storyline, iBook