

**University of California, San Francisco**  
**CURRICULUM VITAE**

**Name:** John T Mongan, MD, PhD

**Position:** Associate Professor of Clinical Radiology, Step 2  
Radiology  
School of Medicine

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**EDUCATION**

|             |                                        |          |                                                        |                    |
|-------------|----------------------------------------|----------|--------------------------------------------------------|--------------------|
| 1995 - 1999 | Stanford University                    | B.S.     | Chemistry with Honors and Distinction                  |                    |
| 2000 - 2008 | University of California San Diego     | MD       |                                                        |                    |
| 2002 - 2006 | University of California San Diego     | PhD      | Bioinformatics                                         | J. Andrew McCammon |
| 2008 - 2009 | Kaiser Oakland Medical Center          | Intern   | Internal Medicine                                      |                    |
| 2009 - 2013 | University of California San Francisco | Resident | Diagnostic Radiology                                   |                    |
| 2013 - 2014 | University of California San Francisco | Fellow   | Ultrasound and Abdominal Imaging, Diagnostic Radiology |                    |

**LICENSES, CERTIFICATION**

|      |                                                             |
|------|-------------------------------------------------------------|
| 2009 | California Medical License                                  |
| 2013 | Diagnostic Radiology, American Board of Radiology           |
| 2013 | California Radiology X-Ray Supervisor and Operator Permit   |
| 2016 | Clinical Informatics, American Board of Preventive Medicine |

**PRINCIPAL POSITIONS HELD**

|                |                                         |                                            |                                  |
|----------------|-----------------------------------------|--------------------------------------------|----------------------------------|
| 2013 - 2014    | University of California, San Francisco | Clinical Instructor                        | Radiology and Biomedical Imaging |
| 2014 - 2019    | University of California, San Francisco | Assistant Professor in Residence           | Radiology and Biomedical Imaging |
| 2019 - present | University of California, San Francisco | Associate Professor of Clinical Radiology  | Radiology and Biomedical Imaging |
| 2015 - 2016    | University of California, San Francisco | Associate Chair, Informatics               | Radiology and Biomedical Imaging |
| 2016 - 2020    | University of California, San Francisco | Vice Chair, Informatics                    | Radiology and Biomedical Imaging |
| 2020 - present | University of California, San Francisco | Associate Chair, Translational Informatics | Radiology and Biomedical Imaging |

**OTHER POSITIONS HELD CONCURRENTLY**

|                |                                         |                                           |                                  |
|----------------|-----------------------------------------|-------------------------------------------|----------------------------------|
| 2013 - 2014    | University of California, San Francisco | Chief Fellow, Non-ACGME Radiology Fellows | Radiology and Biomedical Imaging |
| 2014 - present | VA Medical Center, San Francisco        | Attending Radiologist                     | Radiology                        |

**HONORS AND AWARDS**

|      |                                                                      |                                    |
|------|----------------------------------------------------------------------|------------------------------------|
| 1996 | President's Award for Academic Excellence (top 3% of freshman class) | Stanford University                |
| 1997 | Hoefer Prize for best undergraduate natural sciences writing         | Stanford University                |
| 1998 | Chemistry Department Analytical Chemistry Award                      | Stanford University                |
| 1999 | Chemistry Department Marsden Award for top Chemistry graduate        | Stanford University                |
| 2000 | NIH Medical Scientist Training Program                               | University of California San Diego |
| 2003 | Taft Family Physical Sciences Fellow                                 | University of California San Diego |
| 2004 | La Jolla Interfaces in Science Predoctoral Fellow                    | Burroughs Wellcome                 |

|      |                                                                                       |                                                      |
|------|---------------------------------------------------------------------------------------|------------------------------------------------------|
| 2005 | COMP division CCG Graduate Research Excellence Award                                  | American Chemical Society                            |
| 2005 | Student Research Achievement Award                                                    | The Biophysical Society                              |
| 2008 | Free Clinic Leadership Award                                                          | University of California San Diego                   |
| 2008 | Medical School Merck Award for Outstanding Academic Accomplishments (top 3 graduates) | University of California San Diego                   |
| 2013 | Margulis Society Outstanding Radiology Resident Researcher                            | University of California San Francisco               |
| 2021 | Editor's Recognition Award (recognizing consistent excellence as a reviewer)          | RadioGraphics, Radiological Society of North America |
| 2022 | Fellow of the Society of Abdominal Radiology                                          | Society of Abdominal Radiology                       |

## KEYWORDS/AREAS OF INTEREST

Informatics, artificial intelligence, deep learning, machine learning, electronic medical records, imaging comparative effectiveness research, contrast media

## CLINICAL ACTIVITIES

### CLINICAL ACTIVITIES SUMMARY

I was pleased to have my excellence as an Abdominal Radiologist and contributions to the field recognized this year by becoming a **Fellow of the Society of Abdominal Radiology**.

I am the clinical attending physician on the Abdominal Imaging and Ultrasound service **2 days per week 12 months per year**. On a typical day I am responsible for direct supervision of 2-4 medical students, residents and/or fellows. Approximately 30% of my clinical days are on services that perform biopsies; on these days in addition to reading imaging studies I typically teach and supervise or perform 4 image-guided biopsy procedures.

In addition to my service as a Radiologist, I continue to work as a **Clinical Informaticist** under my ABMS board certification in Clinical Informatics. My clinical informatics service constitutes **1.5 days per week 12 months per year**. This certification formalizes and recognizes the clinical judgment I routinely exercise in my leadership of the Imaging IT group (which provides PACS services) and the Radiology Innovation & Analytics team, through my role as Associate Chair, Translational Informatics. As these groups consist of non-physicians, my leadership brings the patient and physician perspectives and priorities to these groups, guiding their work to most effectively support our healthcare mission.

**Organ Transplant** is one of the marquee programs at UCSF; my ultrasound and abdominal imaging service is an integral component of this program. I perform pre-operative imaging evaluation of both living organ donors and recipients. The serial post-operative ultrasounds that I read are a primary assessment of transplanted organ health. Approximately 30% of my procedures are renal transplant biopsies. Additionally, I am often called upon by Transplant

Surgery to come to the operating room and assess the vascularity of organ grafts. My evaluation of the transplanted organ and its vascular anastomoses determine whether the patient will be closed as-is or will require immediate revision of the anastomoses.

I am the Radiology attending presenting imaging for several **tumor boards**. Each of these serves as both a clinical decision making and teaching conference, and involves the participation of attendings, fellows, residents and occasionally medical students from multiple departments. I present at these conferences on a rotating basis with my colleagues in the Ultrasound and Abdominal Imaging Sections; I present on average 2 of these conferences per month, which involves review of 10 to 30 imaging studies prior to the 1 to 1.5 hour conference. These conferences include:

- Liver Tumor Board (twice weekly): Attended by Interventional Radiology, Gastroenterology, Oncology, and Transplant Surgery
- Gastrointestinal Tumor Board (weekly): Attended by Pathology, Gastroenterology and Oncology
- Genito-Urinary Tumor Board (twice monthly): Attended by Pathology, Urology and Oncology
- Adrenal Tumor Board (monthly): Attended by Pathology, Endocrinology, and Surgery
- Gynecologic Oncology Tumor Board (weekly): Attended by Pathology, Medical Oncology and Gynecology Oncology

## CLINICAL SERVICES

|                |                                                             |                                          |
|----------------|-------------------------------------------------------------|------------------------------------------|
| 2014 - 2015    | UCSF Abdominal and Ultrasound Radiology Sections, Attending | 4 days per week,<br>12 months per year   |
| 2015 - 2019    | UCSF Abdominal and Ultrasound Radiology Sections, Attending | 2 days per week,<br>12 months per year   |
| 2019 - 2020    | UCSF Abdominal and Ultrasound Radiology Sections, Attending | 2.5 days per week,<br>12 months per year |
| 2020 - present | UCSF Abdominal and Ultrasound Radiology Sections, Attending | 2 days per week,<br>12 months per year   |

## PROFESSIONAL ACTIVITIES

### MEMBERSHIPS

- 2008 - present Radiological Society of North America
- 2009 - 2017 American College of Radiology
- 2014 - 2016 Society of Radiologists in Ultrasound
- 2014 - present Society of Abdominal Radiologists
- 2015 - present Society for Imaging Informatics in Medicine

## **SERVICE TO PROFESSIONAL ORGANIZATIONS**

|                |                                       |                                                              |
|----------------|---------------------------------------|--------------------------------------------------------------|
| 2015 - 2021    | Radiological Society of North America | RadLex Steering Committee Member                             |
| 2018 - 2020    | Radiological Society of North America | R&E Foundation Education Study Section Member                |
| 2018 - 2020    | Radiological Society of North America | Scientific Program Committee Member                          |
| 2018 - 2019    | Radiological Society of North America | Machine Learning Steering Committee Member                   |
| 2019 - 2020    | Radiological Society of North America | Machine Learning Steering Committee, Vice Chair              |
| 2020 - present | Radiological Society of North America | Machine Learning Steering Committee, Chair                   |
| 2020 - present | Society of Abdominal Radiology        | Informatics Committee Member                                 |
| 2020 - present | Society of Abdominal Radiology        | Artificial Intelligence Emerging Technology Committee Member |
| 2021 - present | Radiological Society of North America | Imaging Informatics Meeting Program Subcommittee Member      |
| 2021 - present | Radiological Society of North America | Organizer, AI Safety Summit                                  |

## **SERVICE TO PROFESSIONAL PUBLICATIONS**

|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| 2015 - present | Emergency Medicine Journal - Reviewer                              |
| 2017 - present | Radiology - Reviewer                                               |
| 2018 - present | Radiology: Artificial Intelligence - Associate Editor              |
| 2018 - present | Radiographics - Informatics review panel                           |
| 2019 - present | Journal of Digital Imaging - Reviewer                              |
| 2021 - present | Journal of the American Medical Informatics Association - Reviewer |
| 2021 - 2022    | Radiology: Artificial Intelligence - Special issue Guest Editor    |
| 2021 - present | European Radiology - Reviewer                                      |

2021 - present IEEE Transactions on Artificial Intelligence - Reviewer

2022 - present The Lancet Digital Health - Reviewer

### INVITED PRESENTATIONS - INTERNATIONAL

|      |                                                                                                                                                                                                             |                       |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 2013 | Dual Contrast Dual-Energy CT in Imaging of Penetrating Abdominal Trauma. Contrast Media Research Symposium. Beijing, China                                                                                  |                       |
| 2017 | Dose Reduction in Abdominal CT. Partnership for Dose Collaborative, Sausalito, California.                                                                                                                  |                       |
| 2020 | Radiology and Machine Learning: from Dialogue to Clinical Practice. Medical Image Computing and Computer Assisted Interventions (MICCAI) Annual Meeting. Scheduled for Lima, Peru; virtual due to pandemic. | Plenary session panel |
| 2021 | Critical Evaluation of AI for Purchase and Deployment. 102nd German Röntgen Congress (virtual due to pandemic).                                                                                             | Plenary speaker       |
| 2022 | Clinically Effective AI. 45th Colombian Congress of Radiology. Cartagena, Colombia.                                                                                                                         |                       |
| 2022 | The Future of Radiology Enabled by AI. 45th Colombian Congress of Radiology. Cartagena, Colombia.                                                                                                           | Plenary speaker       |

### INVITED PRESENTATIONS - NATIONAL

|      |                                                                                                                                                                                                    |  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 2004 | Recent Developments in Constant pH Molecular Dynamics. AMBER Development Conference Stony Brook, New York. (AMBER is a leading software package for computational molecular dynamics simulations.) |  |
| 2005 | Implementation of Molecular Surface Generalized Born. AMBER Development Conference, Salt Lake City, Utah.                                                                                          |  |
| 2012 | Trauma Imaging with Color Contrast for Color CT: In Vivo Use of Complementary Contrast Materials at Dual-energy Computed Tomography. Radiological Society of North America, Chicago, Illinois      |  |
| 2015 | CT and MR Safety. UCSF Radiology Board Review CME Course, San Francisco, California                                                                                                                |  |
| 2015 | Ultrasound Technical Tips and Tricks. UCSF Radiology Board Review CME Course, San Francisco, California                                                                                            |  |
| 2015 | Radiology Informatics. UCSF Radiology Fall Highlights CME course, San Francisco, California                                                                                                        |  |
| 2016 | CT and MR Safety. UCSF Radiology Board Review CME Course, San Francisco, California                                                                                                                |  |

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|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 2016 | Ultrasound Technical Tips and Tricks. UCSF Radiology Board Review CME Course, San Francisco, California                                                          |                       |
| 2016 | Thyroid Nodules: What to Evaluate, Which to Biopsy and How to Be Successful Every Time. Society of Abdominal Radiology, Waikoloa Village, Hawaii.                | Workshop              |
| 2016 | Context Integration of EMR (Electronic Medical Record) with PACS Increases Radiologist Use of EMR. Society of Imaging Informatics in Medicine, Portland, Oregon. |                       |
| 2017 | Ultrasound Technical Tips and Tricks. UCSF Radiology Board Review CME Course, San Francisco, California                                                          |                       |
| 2017 | CT and MR Safety. UCSF Radiology Board Review CME Course, San Francisco, California                                                                              |                       |
| 2017 | Dual-energy CT Image Visualization. Society of Abdominal Radiology, Hollywood, Florida.                                                                          | Workshop              |
| 2018 | Ultrasound Technical Tips and Tricks. UCSF Radiology Board Review CME Course, San Francisco, California                                                          |                       |
| 2018 | CT and MR Safety. UCSF Radiology Board Review CME Course, San Francisco, California                                                                              |                       |
| 2018 | Avoiding Pitfalls in Study Design and Data Analysis. Society of Abdominal Radiology, Scottsdale, Arizona.                                                        |                       |
| 2018 | Leveraging CDS Technology Successfully. Radiology Business Management Association 2018 PaRADigm, San Diego, California.                                          | Plenary session panel |
| 2018 | Pancreatic Adenocarcinoma: Diagnosis, Staging and Mimics. UCSF Diagnostic Imaging Update, Kauai, Hawaii.                                                         |                       |
| 2018 | Understanding and Optimizing CT Radiation Dose. UCSF Diagnostic Imaging Update, Kauai, Hawaii.                                                                   |                       |
| 2018 | Artificial Intelligence/Deep Learning: Implications for Radiologists. UCSF Diagnostic Imaging Update, Kauai, Hawaii.                                             |                       |
| 2018 | What You Need to Know About the New Medicare Radiology Decision Support Requirement. UCSF Diagnostic Imaging Update, Kauai, Hawaii.                              |                       |
| 2018 | How to be Successful Every Time with US-Guided Thyroid Biopsy. UCSF Diagnostic Imaging Update, Kauai, Hawaii.                                                    |                       |
| 2018 | Ultrasound Evaluation of Organ Transplants. UCSF Diagnostic Imaging Update, Kauai, Hawaii.                                                                       |                       |
| 2018 | Artificial Intelligence in Radiology. Radiological Society of North America, Chicago, Illinois.                                                                  | Moderator             |

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|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 2019 | Dataset Curation and Annotation. American Roentgen Ray Society, Honolulu, Hawaii.                                                                                                |                 |
| 2019 | Lifecycle of a Radiology Exam. National Imaging Informatics Course, hosted online by Radiological Society of North America and Society for Imaging Informatics in Medicine.      | Plenary speaker |
| 2019 | Ultrasound Technical Tips and Tricks. UCSF Radiology Board Review CME Course. San Francisco, California                                                                          |                 |
| 2019 | Playing it Safe: What you Need to Know About MR and CT Safety. UCSF Radiology Board Review CME Course, San Francisco, California                                                 |                 |
| 2019 | How To Be Successful with US Thyroid Biopsy. UCSF Diagnostic Imaging Update, Maui, Hawaii.                                                                                       |                 |
| 2019 | US of Organ Transplants. UCSF Diagnostic Imaging Update, Maui, Hawaii.                                                                                                           |                 |
| 2019 | Improved US Diagnosis: Technical Tips. UCSF Diagnostic Imaging Update, Maui, Hawaii.                                                                                             |                 |
| 2019 | Pancreatic adenocarcinoma: Diagnosis, Staging, Mimics. UCSF Diagnostic Imaging Update, Maui, Hawaii.                                                                             |                 |
| 2019 | CT/MR Safety. UCSF Diagnostic Imaging Update, Maui, Hawaii.                                                                                                                      |                 |
| 2019 | AI and Deep Learning: Implications for Radiologists. UCSF Diagnostic Imaging Update, Maui, Hawaii.                                                                               |                 |
| 2019 | Artificial Intelligence: NLP and Reporting. Radiological Society of North America, Chicago, Illinois.                                                                            | Moderator       |
| 2020 | Thyroid Nodules: What To Evaluate, Which To Biopsy and How To Be Successful Every Time. Society of Abdominal Radiology, Maui, Hawaii.                                            |                 |
| 2020 | Sonographic Evaluation of Kidney and Liver Transplants. Association of Program Directors in Radiology, National Noon Conference Series. (virtual for Covid-19)                   |                 |
| 2020 | Decision Support and Implications for Federal Regulations (PAMA): What You Need to Know and Do. Radiological Society of North America, Chicago, Illinois. (virtual for Covid-19) | Panelist        |
| 2020 | Pulmonary Embolism Machine Learning Challenge Winners and Awards. Radiological Society of North America, Chicago, Illinois. (virtual for Covid-19)                               | Panelist        |

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|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 2021 | Ultrasound: Technical Tips & Artifacts. UCSF Radiology Annual Review, San Francisco, California (virtual for Covid-19)                                          |          |
| 2021 | Radiology Safety: Need to Know. UCSF Radiology Annual Review, San Francisco, California (virtual for Covid-19)                                                  |          |
| 2021 | Automated detection of IVC Filters with a Deep Object Detection Network. Society for Imaging Informatics in Medicine (virtual for Covid-19)                     | Podium   |
| 2021 | Behind the scenes of the 2021 SIIM-FISABIO-RSNA Covid-19 Pneumonia Detection Challenge. Society for Imaging Informatics in Medicine (virtual for Covid-19)      | Panelist |
| 2021 | Imaging CDS, AUC, and Lessons Learned. Healthcare Information and Management Systems Society (virtual for Covid-19)                                             | Panelist |
| 2021 | SIIM-FISABIO-RSNA Covid-19 Pneumonia Detection Kaggle Challenge Winners' Showcase. Conference on Machine Intelligence in Medical Imaging (virtual for Covid-19) | Panelist |
| 2021 | Safe and Effective Translation of Artificial Intelligence: From the Lab to the Reading Room. University of Washington, Seattle, Washington.                     |          |
| 2021 | Current State of AI in Radiology. Radiological Society of North America, Chicago, Illinois.                                                                     | Panelist |
| 2021 | Medical Imaging and Data Resource Center: A Multi-Society Approach to Advance Research on COVID-19. Radiological Society of North America, Chicago, Illinois.   | Panelist |
| 2021 | Failure in Clinical Artificial Intelligence: Lessons from Aviation. Radiological Society of North America, Chicago, Illinois.                                   |          |
| 2021 | Best Practices in Radiology: Clinical Decision Support Rollout. Radiological Society of North America, Chicago, Illinois.                                       | Panelist |
| 2021 | RSNA AI Challenge: Brain Tumor AI Challenge Recognition Event. Radiological Society of North America, Chicago, Illinois.                                        | Panelist |
| 2021 | Data Normalization. RSNA Imaging Artificial Intelligence Certificate Program (virtual)                                                                          |          |
| 2021 | Data Annotation. RSNA Imaging Artificial Intelligence Certificate Program (virtual)                                                                             |          |

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|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 2022 | Pancreatic Adenocarcinoma: How to Diagnose, Stage and Recognize Mimics. UCSF Body Imaging: Abdominal & Thoracic. Kona, Hawaii.                              |                               |
| 2022 | Artificial Intelligence: What Does it Mean for Radiologists? UCSF Body Imaging: Abdominal & Thoracic. Kona, Hawaii.                                         |                               |
| 2022 | Artificial Intelligence: How to Evaluate and Purchase. UCSF Body Imaging: Abdominal & Thoracic. Kona, Hawaii.                                               |                               |
| 2022 | Ultrasound Evaluation of Organ Transplants. UCSF Body Imaging: Abdominal & Thoracic. Kona, Hawaii.                                                          |                               |
| 2022 | US-guided Thyroid Biopsy: How to be Successful Every Time. UCSF Body Imaging: Abdominal & Thoracic. Kona, Hawaii.                                           |                               |
| 2022 | New Medicare Radiology Decision Support Requirement: What You Need to Know. UCSF Body Imaging: Abdominal & Thoracic. Kona, Hawaii.                          |                               |
| 2022 | Purchasing AI Applications. Society of Abdominal Radiology, Scottsdale, Arizona.                                                                            | Plenary speaker               |
| 2022 | Critical Evaluation of AI for Purchase and Deployment. Society of Abdominal Radiology, Scottsdale, Arizona.                                                 |                               |
| 2022 | Infrastructure Considerations for AI Purchase. ACR - SIIM Data Science Summit, Orlando, Florida.                                                            |                               |
| 2022 | Public Dataset Annotation. Society for Imaging Informatics in Medicine, Orlando Florida                                                                     | Speaker and session organizer |
| 2022 | American College of Radiology Artificial Intelligence Journal Club: Considerations for AI Purchasing Process (online)                                       | Panelist                      |
| 2022 | Technical Advancements in Clinical Machine Learning - What's New in 2022. Precision Medicine Worldwide Conference, Santa Clara, California                  | Panelist                      |
| 2022 | Understanding and Communicating Artificial Intelligence: Reading, Writing and Reviewing - Methods. Radiological Society of North America, Chicago, Illinois | Speaker and session organizer |
| 2022 | The Analytics and Dashboarding of Value-Based Imaging Care. Radiological Society of North America, Chicago, Illinois                                        | Panelist                      |

## INVITED PRESENTATIONS - REGIONAL AND OTHER INVITED PRESENTATIONS

|      |                                                                                                                                      |              |
|------|--------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 2005 | Fast Molecular Surface Generalized Born. Accelrys Corporation San Diego, California.                                                 |              |
| 2014 | Using Radiology Effectively. UCSF Internal Medicine Residents.                                                                       |              |
| 2014 | Ultrasound-guided FNA: How to hit the lesion (almost) every time. UCSF Radiology Residents.                                          |              |
| 2014 | Using Radiology Effectively. UCSF Emergency Medicine Resident Conference and CME Lecture.                                            |              |
| 2015 | CT Systems. UCSF Radiology Residents.                                                                                                |              |
| 2015 | CT Dosimetry. UCSF Radiology Residents.                                                                                              |              |
| 2015 | Ultrasound of Transplants. UCSF Radiology Sonography for Sonographers CME course.                                                    |              |
| 2015 | Radiology Physics Review. UCSF Radiology Residents.                                                                                  |              |
| 2015 | Ultrasound of solid organ transplants. UCSF Radiology Residents.                                                                     |              |
| 2015 | Statistics in R for Radiologists. UCSF Radiology Residents.                                                                          |              |
| 2015 | PAMA and Clinical Decision Support. UCSF Radiology Residents.                                                                        |              |
| 2015 | Pancreatic Adenocarcinoma and Mimics. UCSF Abdominal Imaging Fellows.                                                                |              |
| 2016 | Natural Language Processing in Radiology. UCSF Radiology Residents.                                                                  |              |
| 2016 | Clinical Decision Support: Realizing the Potential of Computers in Medicine. UC Davis Radiology Grand Rounds, Sacramento, California | Grand Rounds |
| 2016 | Ultrasound-guided Thyroid Fine Needle Aspiration. UC Davis Radiology Residents, Sacramento, California                               |              |
| 2016 | CT Systems. UCSF Radiology Residents.                                                                                                |              |
| 2016 | CT Dosimetry. UCSF Radiology Residents.                                                                                              |              |
| 2016 | Ultrasound-guided Thyroid Fine Needle Aspiration. UCSF Abdominal Imaging Fellows.                                                    |              |
| 2016 | Clinical Decision Support: Realizing the Potential of Computers in Medicine. UCSF Radiology Residents.                               |              |
| 2016 | UCSF Radiology Informatics Overview. UCSF Radiology Residents.                                                                       |              |

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|------|-------------------------------------------------------------------------------------------------------|--------------|
| 2016 | Ultrasound-guided Thyroid Fine Needle Aspiration. UCSF Radiology Residents.                           |              |
| 2017 | Using Radiology Effectively. UCSF Internal Medicine Residents.                                        |              |
| 2017 | A Celebration of 25 Years of Radiological Informatics. UCSF Radiology Grand Rounds.                   | Grand Rounds |
| 2017 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Radiology Residents.                           |              |
| 2017 | Using Radiology Effectively. UCSF Internal Medicine Residents.                                        |              |
| 2017 | Ultrasound-guided Thyroid Fine Needle Aspiration. UCSF Radiology Residents.                           |              |
| 2017 | Using Radiology Effectively. OneMedical Grand Rounds, San Francisco, California.                      | Grand Rounds |
| 2017 | Artificial Intelligence and the Future of Radiology. UCSF Osher Mini-Med School.                      |              |
| 2018 | CT Systems. UCSF Radiology Residents.                                                                 |              |
| 2018 | CT Dosimetry. UCSF Radiology Residents.                                                               |              |
| 2018 | Artificial Intelligence in Medicine. UCSF Division of Neuroinflammation and Glial Biology.            | Grand Rounds |
| 2018 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Radiology Residents.                           |              |
| 2018 | Pancreatic Adenocarcinoma and Mimics. UCSF Radiology Residents.                                       |              |
| 2018 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Abdominal Imaging Fellows.                     |              |
| 2018 | Artificial Intelligence in Radiology. UCSF Radiology Residents.                                       |              |
| 2019 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Abdominal Imaging Fellows.                     |              |
| 2019 | Ultrasound-guided Thyroid Fine Needle Aspiration. UCSF Abdominal Imaging Fellows.                     |              |
| 2019 | Artificial Intelligence in Medicine. Fromm Institute, San Francisco, California.                      |              |
| 2019 | Artificial Intelligence: What is it and what does it mean for radiologists. UCSF Radiology Residents. |              |
| 2020 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Radiology Residents.                           |              |

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|------|--------------------------------------------------------------------------------------------------|
| 2020 | The Role of Health Informatics Professionals in Medical AI. Grand Rounds UCSF Health Informatics |
| 2020 | Ultrasound-guided Thyroid Fine Needle Aspiration. UCSF Abdominal Imaging Fellows.                |
| 2020 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Abdominal Imaging Fellows.                |
| 2020 | CT Systems. UCSF Radiology Residents.                                                            |
| 2021 | Ultrasound Physics. UCSF Radiology Residents.                                                    |
| 2021 | Ultrasound MCQ Board Review. UCSF Radiology Residents.                                           |
| 2021 | CT Dosimetry. UCSF Radiology Residents.                                                          |
| 2021 | Pancreatic Adenocarcinoma Diagnosis, Staging and Mimics. UCSF Abdominal Imaging Fellows.         |
| 2021 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Abdominal Imaging Fellows.                |
| 2021 | Ultrasound-guided Thyroid Fine Needle Aspiration. UCSF Abdominal Imaging Fellows.                |
| 2021 | Ultrasound Evaluation of Solid Organ Transplants. UCSF Radiology Residents.                      |
| 2021 | CT Systems. UCSF Radiology Residents.                                                            |
| 2022 | Ultrasound Physics. UCSF Radiology Residents.                                                    |

## GOVERNMENT AND OTHER PROFESSIONAL SERVICE

|             |                                  |                                        |
|-------------|----------------------------------|----------------------------------------|
| 2020 - 2021 | DFG (German Research Foundation) | Artificial Intelligence Grant Reviewer |
| 2021 - 2021 | STARD-AI reporting guideline     | Expert Consensus Panel Member          |
| 2022 - 2022 | Rosetrees Trust (United Kingdom) | Interdisciplinary Grant Reviewer       |

## UNIVERSITY AND PUBLIC SERVICE

### SERVICE ACTIVITIES SUMMARY

Since submission of my CV in spring 2020 for my most recent advancement, effective 7/1/21, I have successfully **led the replacement of the decades-old Radiology PACS, led the deployment of the first artificial intelligence (AI) algorithm into regular clinical use by Radiology and led the renewal of University of California-wide certification by the Center for Medicare & Medicaid Services (CMS) for creation of imaging Appropriate Use Criteria.** My campus leadership in informatics and IT has been recognized by **appointment to chair**

**the Chief Research Informatics Officer (CRIO) Task Force** and serve on the Associate Chief Informatics Officer - Research interview panel.

PACS is the software used by radiologists to display and manipulate medical images. It is used all day, every day by every UCSF radiologist working clinically, and is essential to the efficiency of clinical operation of the department. Building on my success in representing UCSF in the UC-wide PACS Selection RFP, in partnership with the Associate Chair Clinical Informatics over the last two years I **led the successful replacement of the decades-old PACS system**, replacing four poorly integrated clinical viewers with a single, consolidated clinical viewer software (Visage). This project supported 10% of my effort during calendar year 2021, including assembling and co-chairing a steering committee consisting of representatives from each clinical section in Radiology, hiring and coordinating a team of consultants and meeting regularly with vendors and the Imaging IT team. We **completed the \$10.3M project on time and under budget, delivering a system that radiologists are enthusiastic about** using and found more efficient than the old system even on their first day using it. This is the first Tier 1 clinical system at UCSF to be deployed in the cloud. Our successful go-live in December 2021 **served as the model for subsequent implementations at UCI and UCSD**. The success of the project and my leadership of it was recognized in the UCSF CIO news: <https://it.ucsf.edu/news/ucsf-it-radiology-collaborate-solve-decade-long-challenge> .

In my role as a **Director of the UCSF Center for Intelligent Imaging (Ci2)**, I **led the deployment of UCSF's first imaging-based AI algorithm** into regular clinical usage. I had previously served as UCSF's site PI for the multi-center validation of the algorithm, which enables coronary artery calcium scoring, a strong predictor of coronary artery disease, to be performed on all non-contrast chest CTs, rather than only logistically complex cardiac-gated cardiac CTs. To guide this process, I **developed a framework for evaluating whether and how an AI algorithm should be deployed** clinically, which was used by the Ci2 Clinical Deployment committee that I chair to evaluate and approve the algorithm. The committee is currently evaluating two additional AI algorithms using the framework. In this role I also promote the infrastructure, education and research missions of Ci2 through chairing the Scientific Computing Services Steering Committee and serving on the Infrastructure, Education and Scientific Research Group Committees.

As the **chair of the UC-wide Appropriate Imaging Coalition** ( <https://qple.ucop.edu> ) I **led the successful renewal of certification of the University of California by the Center for Medicare and Medicaid Services (CMS)** as a qualified provider-led entity (QPLE) under the imaging clinical decision report requirement of the Protecting Access to Medicare Act (PAMA). This makes UC one of only twelve healthcare organizations in the country certified to create Appropriate Use Criteria (AUC) to meet the requirement. The six AUC for which I led development through the Coalition continue to be valid due to this recertification; **without this recertification, the five medical campuses of UC would no longer be paid for CT, MR or nuclear medicine studies of Medicare patients** after January 1, 2023. As chair of the Coalition, my on-going responsibilities include supervising and coordinating six multidisciplinary teams in their annual review and revision of the AUC, supervision of a medical librarian employed by the program and negotiating, securing and managing the budget of \$120k/yr. My responsibilities as chair of this program require substantial investment of time; I am **supported by the program at 10% effort**.

Compliance with CMS regulations requires **implementation of the AUC set into a clinical decision support system to be consulted for every outpatient Medicare imaging order**. I continue to lead the implementation and optimization of a compliant system at UCSF, in

conjunction with physician representatives from Emergency and Ambulatory Medicine, as part of the **Imaging Clinical Decision Support Implementation Task Force**.

I employ my **expertise in IT and informatics to provide campus-wide service** in multiple venues. In the past year I was appointed **chair of the Chief Research Informatics Officer (CRIO) Task Force**, charged with determining whether UCSF should create a CRIO position, and served as a member of the Associate Chief Informatics Officer - Research interview panel to select UCSF's first ACIO - Research. I continue to serve on the campus-wide **Enterprise Imaging (VNA) Steering Committee**, providing guidance for the UCSF implementation and use of the archive. As a member of the **IT Governance Committee on Research Technology**, I provide perspective of the computational needs of both clinical researchers and imaging researchers.

## UNIVERSITY SERVICE

### UC SYSTEM AND MULTI-CAMPUS SERVICE

|                |                                                                                     |        |
|----------------|-------------------------------------------------------------------------------------|--------|
| 2015 - 2015    | Imaging Ordering Clinical Decision Support Proposal Review Committee                | Member |
| 2015 - 2017    | UC Enterprise Imaging Steering Committee                                            | Member |
| 2015 - present | University of California Imaging Appropriate Use Criteria (QPLE) Steering Committee | Chair  |
| 2017 - 2020    | UC Imaging Decision Support Steering Committee                                      | Member |
| 2018 - 2020    | UC PACS Selection Committee                                                         | Member |

### UCSF CAMPUSWIDE

|                |                                                                                        |        |
|----------------|----------------------------------------------------------------------------------------|--------|
| 2014 - 2018    | Resource Allocation Program (RAP) Grant Review Committee                               | Member |
| 2016 - 2017    | Institute for Computational Health Sciences (ICHS) Faculty Search Committee (JPF01218) | Member |
| 2017 - 2018    | Enterprise Cloud Service Working Group                                                 | Member |
| 2018 - present | Enterprise Imaging (VNA) Steering Committee                                            | Member |
| 2018 - present | IT Governance Committee on Research Technology                                         | Member |
| 2019 - present | Imaging Clinical Decision Support (CDS) Implementation Task Force                      | Member |
| 2020 - present | Center for Intelligent Imaging (CI2) Steering Committee                                | Member |
| 2020 - present | Center for Intelligent Imaging Clinical Deployment Pillar Committee                    | Chair  |
| 2020 - present | Center for Intelligent Imaging Education Pillar Committee                              | Member |
| 2020 - present | Center for Intelligent Imaging Scientific Research Group Committee                     | Member |
| 2020 - present | Center for Intelligent Imaging Infrastructure Committee                                | Member |

|                |                                                                                              |        |
|----------------|----------------------------------------------------------------------------------------------|--------|
| 2022 - present | Chief Research Informatics Officer Task Force                                                | Chair  |
| 2022 - present | Associate Chief Information Officer Research Interview Panel                                 | Member |
| 2022 - present | Chief Research Informatics Office Search Committee                                           | Chair  |
| 2022 - present | Chief, Division of Clinical Informatics and Digital Transformation (DoC-IT) Search Committee | Member |

## SCHOOL OF MEDICINE

|             |                                                                            |        |
|-------------|----------------------------------------------------------------------------|--------|
| 2011 - 2014 | APeX (Epic Electronic Medical Record) Fellows and Residents Advisory Group | Member |
| 2017 - 2017 | Strategic Plan Working Group: Data and Technology                          | Member |

## DEPARTMENTAL SERVICE

|                |                                                                  |                |
|----------------|------------------------------------------------------------------|----------------|
| 2012 - 2013    | Resident Quality Improvement Project (Radiation Dose Reporting ) | Project Leader |
| 2013 - 2014    | Non-ACGME Radiology Fellows                                      | Chief Fellow   |
| 2015 - present | Operations Committee                                             | Member         |
| 2015 - present | Executive Committee                                              | Member         |
| 2019 - present | Scientific Computing Services Steering Committee                 | Chair          |
| 2021 - present | AIIMS (New PACS Deployment) Steering Committee                   | Co-chair       |

## SERVICE AT OTHER UNIVERSITIES

|                |                                        |        |
|----------------|----------------------------------------|--------|
| 2020 - present | CSU Chico Cybersecurity Advisory Board | Member |
|----------------|----------------------------------------|--------|

## COMMUNITY AND PUBLIC SERVICE

|                |                           |                          |
|----------------|---------------------------|--------------------------|
| 2016 - present | Bay Area Science Festival | UCSF Radiology Volunteer |
|----------------|---------------------------|--------------------------|

## CONTRIBUTIONS TO DIVERSITY

### CONTRIBUTIONS TO DIVERSITY Contributions to Diversity, Equity & Inclusion Guidance

Since submission of my CV in spring of 2020 for my most recent advancement, effective 7/1/21, I have continued to build on my Differences Matter Diversity, Equity and Inclusion Champion training by **mentoring and sponsoring two additional women in the faculty and residency** in informatics and artificial intelligence activities. Artificial intelligence (AI) and informatics suffer from even lower representation of women and under-represented minorities than radiology as a whole, and I have been working to address this on an individual basis through identifying under-represented people with interests in these areas, mentoring them and promoting and sponsoring their involvement in related activities. I have begun mentoring Katie Grouse (neurology faculty) in research, involving her in a sponsored research project with Siemens to add AI understanding of text-based reason for exam to the clinical decision

support system used for ordering imaging. I also began mentorship of Maggie Chung, one of our radiology residents, in AI research, which has led to a joint conference abstract and manuscript currently under revision for the journal Radiology. I continue to sponsor and mentor Kim Kallianos' work in AI, partnering with her to deploy into routine clinical practice the AI-based coronary calcium scoring algorithm that we worked on together.

I mentored Igor Teodoro, a Brazilian medical student with an interest in informatics and clinical decision support, involving him in the work of the UC Appropriate Imaging Coalition that I chair. I have mentored and sponsored Tatiana Kelil, including promoting her as our department's expert on 3D printing, nominating her to take over my position on the UCSF RAP grant review committee and nominating her for a position on the Informatics section of the Radiological Society of North America Scientific Program Committee.

I have begun a new research project, SYRMOUNT, which applies AI to retrospectively analyze the reasons for and outcomes of imaging in women with breast cancer with a goal of identifying how imaging can be used more effectively for these women.

## TEACHING AND MENTORING

### TEACHING SUMMARY

Since submission of my CV in spring 2020 for my most recent advancement, effective 7/1/21, I have leveraged my expertise in AI to serve as a lecturer for the Masters of Science in Biomedical Imaging (MSBI program) through BioEng 245. I have continued to play a major role in CME efforts, serving as a primary lecturer (delivering 6 lectures) at a recent UCSF Radiology CME course.

My continuing teaching activities include:

- **Informal Teaching** - Most of my teaching time is in the setting of the reading room. Approximately 95% of my clinical work is done in conjunction with a resident or fellow. For diagnostic studies, this involves sitting side by side, reviewing each imaging finding as I read each case, and discussing how to put the findings into the context of the patient history to arrive at an imaging differential diagnosis and impression. For biopsies, I discuss the steps of the procedure and approach with trainees immediately before we begin. I directly supervise my trainees in each procedure, reviewing their planned approach, providing guidance during the procedure, and stepping in to perform portions of the procedure when necessary. I always provide a debrief session after each procedure to discuss what went well, what needed improvement and how the next biopsy can be better. When we have medical students in the reading room, I actively engage them and get them logged in to their own imaging station (PACS) so they can actively participate in reading imaging. I tailor my instruction of them towards what will have greatest utility to them in their future specialty within medicine. Clinical teams frequently consult us in the reading room; interacting with these teams gives me an opportunity to teach imaging findings and effective use of imaging to trainees from other departments, as well as to learn from them what questions and pieces of information are most important to them.
- **Formal Teaching** - Drawing on the combination of my experience in AI and clinical Radiology, I lecture in BioEng 245 on the keys to developing and deploying clinically effective AI. I find formal teaching of students highly rewarding and welcome the opportunity to share what I love about my research and the specialty of medicine to which I've devoted my career.
- **Lecturing Outside of Scheduled Classes** - I regularly lecture radiology trainees at our daily morning and noon conferences. Drawing on my PhD work in computational biophysics, many of my lectures fall within the radiology physics curriculum. Beyond the radiology department, I make an active effort to engage residents from other programs and have delivered lectures on

effective use of imaging to both the internal medicine and emergency medicine residency programs.

### FORMAL TEACHING

|  | Academic Yr | Course No. & Title                            | Teaching Contribution     | School   | Class Size |
|--|-------------|-----------------------------------------------|---------------------------|----------|------------|
|  | 2013 - 2014 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 9          |
|  | 2014 - 2015 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 14         |
|  | 2014 - 2015 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 15         |
|  | 2014 - 2015 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 10         |
|  | 2014 - 2015 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 23         |
|  | 2014 - 2015 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 12         |
|  | 2014 - 2015 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 12         |
|  | 2015 - 2016 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 15         |
|  | 2015 - 2016 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 17         |
|  | 2015 - 2016 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 17         |
|  | 2015 - 2016 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 14         |
|  | 2015 - 2016 | 140.03 Diagnostic Radiology                   | Ultrasound lab instructor | Medicine | 16         |
|  | 2015 - 2016 | 198 Independent Study in Radiology            | Mentor                    | Medicine | 1          |
|  | 2015 - 2016 | 170.07 Current Issues in Medical Informatics  | Guest lecturer            | Medicine | 3          |
|  | 2016 - 2017 | IDS 106: Methods, Mechanisms and Malignancies | Small group instructor    | Medicine | 12         |

|  | Academic Yr | Course No. & Title                                   | Teaching Contribution     | School   | Class Size |
|--|-------------|------------------------------------------------------|---------------------------|----------|------------|
|  | 2016 - 2017 | RAD 140.19: Advanced Clinical Clerkship in Radiology | Supervising radiologist   | Medicine | 1          |
|  | 2016 - 2017 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 17         |
|  | 2016 - 2017 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 14         |
|  | 2016 - 2017 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 15         |
|  | 2016 - 2017 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 15         |
|  | 2016 - 2017 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 17         |
|  | 2017 - 2018 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 15         |
|  | 2017 - 2018 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 15         |
|  | 2017 - 2018 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 18         |
|  | 2017 - 2018 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 19         |
|  | 2017 - 2018 | IDS 113: Appropriate Use of Diagnostic Test          | Lecturer                  | Medicine | 20-50      |
|  | 2017 - 2018 | RAD 140.03: Diagnostic Radiology                     | Ultrasound lab instructor | Medicine | 24         |
|  | 2018 - 2019 | IDS 113: Appropriate Use of Diagnostic Test          | Lecturer                  | Medicine | 20-50      |
|  | 2018 - 2019 | RAD 170.04: Intro to Radiology                       | Lecturer                  | Medicine | 18         |
|  | 2019 - 2020 | RAD 140.19: Advanced Clinical Clerkship in Radiology | Supervising Radiologist   | Medicine | 1          |

|  | Academic Yr | Course No. & Title                                          | Teaching Contribution   | School   | Class Size |
|--|-------------|-------------------------------------------------------------|-------------------------|----------|------------|
|  | 2020 - 2021 | BioEng 245: Machine Learning Algorithms for Medical Imaging | Lecturer                | Grad     | 12         |
|  | 2021 - 2022 | RAD 140.19: Advanced Clinical Clerkship in Radiology        | Supervising Radiologist | Medicine | 1          |
|  | 2021 - 2022 | RAD 140.19: Advanced Clinical Clerkship in Radiology        | Supervising Radiologist | Medicine | 1          |

### INFORMAL TEACHING

2014 - present Residents and Fellows: I am on clinical service 2 days per week, 12 months per year; every one of these days I have 2-4 residents and/or fellows under my direct supervision. Approximately 85% of my time spent reading cases is in direct interaction with a trainee. Each case presents a teaching opportunity; I discuss the findings and their meaning with the trainee as I read each case.

2014 - present Medical Students: Students frequently spend an extended period of time in the reading room as part of RAD 140.19 "Advanced Clinical Clerkship in Radiology." I engage these students and get them logged into their own computer displaying images so they can start doing radiology. I tailor their activities and my instruction to their goals: for future radiologists, I help to start them down the path of being able to interpret studies independently; for future non-radiology clinicians, I focus on how to use radiology effectively and how to understand the meaning and utility of imaging diagnoses.

### MENTORING SUMMARY

Since submission of my CV in spring 2020 for my most recent advancement, effective 7/1/21, I **have mentored six faculty members and two trainees:**

- Katie Grouse is an Asst. Professor of Neurology at UCSF. She works in clinical informatics as part of CHIO Russ Cucina's team. I provide research mentorship in the areas of clinical decision support and artificial intelligence. **This led to shared research support from Siemens.**
- Kim Kallianos is an Asst. Professor of Radiology at UCSF. I provide scholarly and research mentorship on how to plan and undertake studies in artificial intelligence. **This led to joint publications in Nature - Digital Medicine and Clinical Radiology, shared research support from GE, and partnership in clinical deployment of an AI algorithm.**
- Andrew Taylor is an Assoc. Professor of Radiology at UCSF who decided to change his research focus to informatics in 2016. I provide career mentorship to him as he develops his skills and position as a leader in radiology informatics as well as research mentorship on how to structure informatics research. **This led to a joint publication in PLoS: Medicine and shared research support from GE.**

- Tatiana Kelil is an Asst. Professor of Radiology at UCSF. I provide career mentoring to her centering on her role in informatics as well as scholarly mentorship concerning developing an academic program around her 3D expertise.
- Aaron Kornblith is an Assoc. Professor of Emergency Medicine at UCSF. I provide research mentorship supporting his program of developing artificial intelligence-enabled ultrasound systems to reduce the need for CT radiation exposure in pediatric trauma victims. **This led to a K23 grant submission where I am formally listed as a mentor.**
- Roozbeh Houshyar is Director of Informatics and Assoc. Professor of Radiology at UCI. I provide career mentorship centering on his leadership role in radiology informatics within his department and his work implementing clinical systems including Epic/Radiant and PACS, and research mentorship on his work in artificial intelligence and publications in informatics. **This led to a joint publication in Emergency Radiology.**
- Kirti Maguida was a T-32 research and clinical fellow. I provided mentorship on her research projects in artificial intelligence (focusing on prostate) and career and clinical mentorship on her development as a clinical radiologist and informatics researcher.
- Maggie Chung is a radiology resident who will be a breast imaging fellow next year. I mentor her research projects in artificial intelligence and provide career advising. **This led to a joint conference abstract and a joint publication currently in revision for Radiology.**

#### **PREDOCTORAL STUDENTS SUPERVISED OR MENTORED**

| Dates       | Name              | Program or School         | Mentor Type                              | Role                                                                                           | Current Position                     |
|-------------|-------------------|---------------------------|------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------|
| 2011 - 2013 | Samira Rathnayake | UCSF Medical Student      | Research/Scholarly Mentor                | Daily direct supervision and interaction 2011-12; interaction several times per month 2012-13. | Radiologist, Bay Imaging Consultants |
| 2015 - 2016 | Erik Velez        | UCSF Medical Student      | Research/Scholarly Mentor                | Monthly in-person meetings; weekly email.                                                      | Radiology Resident, USC              |
| 2018 - 2019 | Igor Teodoro      | Brazilian Medical Student | Research/Scholarly Mentor, Career Mentor | Twice weekly in person meetings; guided readings; IT shadowing                                 | Radiology Resident                   |

#### **POSTDOCTORAL FELLOWS AND RESIDENTS MENTORED**

| Dates       | Name  | Fellow   | Mentor Role    | Faculty Role                             | Current Position  |
|-------------|-------|----------|----------------|------------------------------------------|-------------------|
| 2014 - 2015 | Yi Li | Resident | Project Mentor | In person meetings monthly, email weekly | Asst. Prof., UCSF |

| Dates       | Name           | Fellow          | Mentor Role                                              | Faculty Role                                                               | Current Position                                                |
|-------------|----------------|-----------------|----------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------|
| 2014 - 2017 | Vignesh Arasu  | Resident        | Career Mentor                                            | In person meetings 2-3 times per year                                      | Radiologist at Kaiser, Investigator Kaiser Division of Research |
| 2014 - 2015 | Mark Kovacs    | Clinical Fellow | Research/Scholarly Mentor                                | In person meetings monthly; email interaction weekly                       | Asst. Prof., Medical University of South Carolina               |
| 2015 - 2016 | Bernice Lau    | Clinical Fellow | Research/Scholarly Mentor                                | In person meetings monthly; email interaction weekly                       | Private Practice Radiologist, Calgary, Canada                   |
| 2015 - 2017 | Jenny Wan      | Resident        | Research/Scholarly Mentor                                | In-person meetings every 2-3 months; email interaction monthly             | Private Practice Radiologist, Burlingame, CA                    |
| 2015 - 2016 | Matt Barkovich | Resident        | Project Mentor                                           | In-person meetings every 2-3 months; email interaction about twice monthly | Asst. Prof., UCSF                                               |
| 2017 - 2018 | Tatiana Kelil  | Clinical Fellow | Research/Scholarly Mentor, Career Mentor                 | Email every month, telephone or in person meeting every 2-3 months         | Asst. Prof., UCSF                                               |
| 2019 - 2020 | Alex Chan      | Clinical Fellow | Research/Scholarly Mentor, Project Mentor, Career Mentor | Email 2-3 times per month, in person meeting monthly                       | Asst. Prof, Mayo Clinic                                         |
| 2019 - 2020 | Ravi Rajpoot   | Clinical Fellow | Career Mentor                                            | In person meetings twice monthly                                           | Private Practice Radiologist                                    |

| Dates          | Name          | Fellow                   | Mentor Role                                                         | Faculty Role                                                   | Current Position |
|----------------|---------------|--------------------------|---------------------------------------------------------------------|----------------------------------------------------------------|------------------|
| 2019 - 2021    | Kirti Magudia | T-32 and Clinical Fellow | Research/Scholarly Mentor, Career Mentor, Co-Mentor/Clinical Mentor | Email 2-3 times per month, in person meeting every other month | Asst. Prof, Duke |
| 2020 - present | Maggie Chung  | Resident                 | Research/Scholarly Mentor, Career Mentor                            | Meetings twice monthly                                         | UCSF Resident    |

**FACULTY MENTORING**

| Dates          | Name             | Position while Mentored    | Mentor Type                              | Mentoring Role                                                                                                                                                             | Current Position                                  |
|----------------|------------------|----------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 2015 - 2019    | Mark Kovacs      | Asst. Professor            | Research/Scholarly Mentor, Career Mentor | Email several times per month, in person meetings at conferences about twice per year. Produced two shared conference abstracts and a co-authored publication (submitted). | Asst. Prof., Medical University of South Carolina |
| 2015 - present | Roosbeh Houshyar | Asst. Professor            | Research/Scholarly Mentor, Career Mentor | Email approximately once per month, telephone calls about six times per year, in person meetings about twice per year.                                                     | Asst. Prof., UC Irvine                            |
| 2016 - 2019    | Tom Loehfelm     | Asst. Professor            | Career Mentor                            | Email 4-5 times per year, in person meetings twice per year                                                                                                                | Asst. Prof., UC Davis                             |
| 2016 - present | Andrew Taylor    | Asst. and Assoc. Professor | Research/Scholarly Mentor, Career Mentor | Email several times per week, in person meetings every other week                                                                                                          | Assoc. Prof., UCSF                                |
| 2018 - 2020    | Hailey Choi      | Asst. Professor            | Research/Scholarly Mentor, Career Mentor | Email several times per month, in person meetings monthly                                                                                                                  | Asst. Prof., UCSF                                 |

| Dates          | Name            | Position while Mentored                    | Mentor Type                              | Mentoring Role                                        | Current Position  |
|----------------|-----------------|--------------------------------------------|------------------------------------------|-------------------------------------------------------|-------------------|
| 2018 - present | Tatiana Kelil   | Asst. Professor                            | Research/Scholarly Mentor, Career Mentor | Email monthly, meeting or phone call every 2-3 months | Asst. Prof., UCSF |
| 2019 - present | Kim Kallianos   | Asst. Professor                            | Research/Scholarly Mentor                | Email weekly, in person meeting monthly               | Asst. Prof, UCSF  |
| 2019 - present | Aaron Kornblith | Asst. and Assoc. Professor (Emergency Med) | Research/Scholarly Mentor                | Email monthly, in person meeting quarterly            | Assoc. Prof, UCSF |
| 2020 - present | Katie Grouse    | Asst. Professor (Neurology)                | Research/Scholarly Mentor                | Virtual meetings every other week                     | Asst. Prof, UCSF  |

## RESEARCH AND CREATIVE ACTIVITIES

### RESEARCH AND CREATIVE ACTIVITIES SUMMARY

Since submission of my CV in spring 2020 for my most recent advancement, effective 7/1/21, my research has focused primarily on **artificial intelligence (AI) (8 publications and 4 new grants and research support contracts)**.

Recognizing the central importance of data in machine learning forms of artificial intelligence, a major focus of my recent research has been on **assembly of large, well-curated and annotated, multi-institutional publicly available imaging datasets**. These include the RSNA International COVID-19 Open Annotated Radiology Database (RICORD), which subsequently formed the basis for the COVID-19 Medical Imaging and Data Resource Center; the RSNA Brain CT Hemorrhage Dataset; and the RSNA Pulmonary Embolism CT Dataset. I obtained grant funding to support my work on MIDRC as a whole, as well as additional grant funding to support the costs of contributing UCSF data to this project. Through my work as the chair of the RSNA Machine Learning Committee, each of these datasets has been promoted through large-scale public machine learning challenges with five-figure prizes hosted on Kaggle.

I am **bringing together my expertise in AI research with my background in imaging clinical decision support and appropriateness through two funded projects**. The first of these, SYRMOUNT, addresses a central challenge with development of evidence-based appropriate use criteria for imaging: there is very little evidentiary basis for most imaging. Datapoints as simple as the pretest probabilities for common imaging indications are almost entirely missing from the literature. In the SYRMOUNT project, I am leading the development of AI models to enable rapid analysis of very large retrospective datasets of imaging. Understanding why imaging was performed and what the imaging outcomes were will provide a major leap forward for evidence-based appropriate use of imaging. A second project uses AI to address the implementation of clinical decision support (CDS). At present, in order for the CDS software to understand why the study is being performed, the ordering provider must

select one or more indications from a list. This is generally less efficient than the traditional free-text reason for exam, and substantially limits the detail about the patient that can be provided to the radiologist. In this sponsored collaboration with Siemens, the UC-wide vendor for imaging CDS software, we are developing AI Natural Language Processing models to enable the CDS to understand the reason that a study is being performed from a free-text reason for exam.

## RESEARCH AWARDS - CURRENT

|                                                  |               |                          |                    |
|--------------------------------------------------|---------------|--------------------------|--------------------|
| 1. 75N92020C00008                                | Project Co-PI | 10 % effort              | Geiger (PI)        |
| NIBIB                                            |               | 08/21/2020               | 08/20/2023         |
| Medical Imaging and Data Resource Center (MIDRC) |               | \$ 3,000,000 direct/yr 1 | \$ 6,000,000 total |

The MIDRC is a large project encompassing the RSNA, ACR and the AAPM to develop infrastructure for obtaining, curating, deidentifying and publicly releasing medical image data. The initial charge is create COVID-19 related datasets that support development of improved imaging-based diagnostic, prognostic and treatment guidance technologies, particularly those incorporating artificial intelligence

I am co-PI on two projects of this contract, one that seeks to develop a large scale repository of multi-institutional imaging and clinical data within the RSNA and a second that develops infrastructure for processing, normalizing and transferring the data from the RSNA repository into the central MIDRC resource where it can be made available to researchers. For both of these projects, I interface with data contributors and supervise and direct the work of RSNA staff in constructing and optimizing infrastructure.

|                                                                                        |    |                       |                 |
|----------------------------------------------------------------------------------------|----|-----------------------|-----------------|
| 2. 2021 DH Mongan<br>C00239380                                                         | PI | 1 % effort            | Mongan (PI)     |
| Siemens                                                                                |    | 09/10/2021            | 04/14/2023      |
| Natural Language Processing of Reason for Exam in<br>Imaging Clinical Decision Support |    | \$ 37,340 direct/yr 1 | \$ 71,697 total |

A major limitation of the Clinical Decision Support (CDS) software required by the Protecting Access to Medicare Act is that ordering providers must indicate the reason they are ordering imaging using a series of check boxes, in addition to the usual free text field, so that the software can understand why the imaging study is being requested. This structured indication capture process is burdensome to ordering providers and limits the richness and detail of the information communicated to radiologists. This project seeks to add artificial intelligence natural language processing functionality to the CDS software so that it can understand the reason for the exam from a free text field, reducing or eliminating the need for extensive series of check boxes.

As PI of this project, I developed the overall project plan and budget, negotiated it with the corporate partner, supervise the data scientist in extraction and deidentification of the clinical data, wrote the IRB application for the retrospective portion of the project, supervised the IRB for the prospective portion of the project, supervise the testing efforts of Katie Grouse, a neurologist investigator, and serve as the key liaison with the corporate partner.

|    |              |             |                    |
|----|--------------|-------------|--------------------|
| 3. | Investigator | 10 % effort | Smith-Bindman (PI) |
|----|--------------|-------------|--------------------|

|                                                                               |            |                    |
|-------------------------------------------------------------------------------|------------|--------------------|
|                                                                               | 11/01/2021 | 10/31/2026         |
| SYStems Research on Misuse, Overuse, and Underuse of iNTERventions (SYRMOUNT) |            | \$ 3,005,100 total |

I direct that artificial intelligence portions of the project. We are developing artificial intelligence models that can automatically classify the reason that and imaging study was performed (e.g. pain, cancer restaging) and the imaging outcome of the study (e.g. no correlate for symptoms of pain, no change in metastases, no evidence of metastases). These models will enable us to analyze and gather statistics on very large numbers of patients without having to do laborious chart review and coding of each patient.

### RESEARCH AWARDS - PAST

|    |                                                                                                                                                                                                                                                                                                                                     |              |                        |                  |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------|------------------|
| 1. | 11-20                                                                                                                                                                                                                                                                                                                               | PI           | 0 % effort             | Mongan (PI)      |
|    | UCSF Radiology                                                                                                                                                                                                                                                                                                                      |              | 11/01/2011             | 10/31/2012       |
|    | Development of dual contrast-enhanced dual energy computed tomography abdominal imaging                                                                                                                                                                                                                                             |              | \$ 3242.00 direct/yr 1 | \$ 3242.00 total |
|    |                                                                                                                                                                                                                                                                                                                                     |              |                        |                  |
| 2. | 1R21EB013816-01                                                                                                                                                                                                                                                                                                                     | Consultant   | 0 % effort             | Yeh (PI)         |
|    | NIBIB (PI: Benjamin Yeh)                                                                                                                                                                                                                                                                                                            |              | 04/01/2012             | 03/30/2014       |
|    | Complementary Injectable Tungsten Contrast for Dual Contrast Dual Energy CT                                                                                                                                                                                                                                                         |              | \$ 231,750 direct/yr 1 | \$ 413,867 total |
|    | The goal of this project is development of a tungsten-based intravenous CT contrast agent with acceptable toxicity profile that is distinguishable from simultaneously administered conventional iodinated contrast at dual energy CT. My role as a consultant is to lead the image processing and analysis aspects of the project. |              |                        |                  |
|    |                                                                                                                                                                                                                                                                                                                                     |              |                        |                  |
| 3. | 2013246                                                                                                                                                                                                                                                                                                                             | Investigator | 1 % effort             | Weber (PI)       |
|    | UCSF Center for Healthcare Value (PI: Ellen Weber)                                                                                                                                                                                                                                                                                  |              | 07/01/2014             | 06/30/2015       |
|    | RADS: Reducing CT use with Apex Decision Rules                                                                                                                                                                                                                                                                                      |              | \$ 25,000 direct/yr 1  | \$ 25,000 total  |
|    | This project incorporates well-validated clinical decision rules for pulmonary embolism testing into the CT angiogram for PE order to decrease the number of scans ordered without decreasing our ability to detect this high-risk disease.                                                                                         |              |                        |                  |
|    |                                                                                                                                                                                                                                                                                                                                     |              |                        |                  |
| 4. |                                                                                                                                                                                                                                                                                                                                     | PI           | 5 % effort             | Mongan (PI)      |
|    | Enlitic, Inc.                                                                                                                                                                                                                                                                                                                       |              | 8/29/2016              | 8/29/2017        |
|    | Evaluation of Deep Learning Classifiers for Lung Cancer                                                                                                                                                                                                                                                                             |              | \$ 23,775 direct/yr 1  | \$ 23,775 total  |

Deep learning neural network techniques have recently shown great promise in image recognition and analysis. Enlitic, Inc has developed deep learning-based classifiers to predict malignancy of lung lesions on chest CT, but the performance of these classifiers has not been sufficiently characterized. This investigation will use retrospective imaging and pathology data from UCSF to evaluate the performance of deep learning classifiers.

As the PI of this project, I designed the study protocol, wrote the IRB application, identified the data to be extracted, supervised deidentification of the data, and worked with investigators at Enlitic to analyze the results of the classifier output and draft manuscripts.

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|    |                                                                        |                 |                           |                  |
|----|------------------------------------------------------------------------|-----------------|---------------------------|------------------|
| 5. | R21DK109433                                                            | Co-investigator | 10 % effort               | Chi (PI)         |
|    | NIDDK                                                                  |                 | 06/01/2016                | 05/31/2018       |
|    | Can Contrast-Enhanced Ultrasound Replace<br>Fluoroscopic Nephrostogram |                 | \$ 150,000<br>direct/yr 1 | \$ 275,000 total |

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Fluoroscopic nephrostogram is commonly used after percutaneous nephrolithotomy to assess ureteral patency prior to removal of nephrostomy tubes. While this diagnostic procedure is effective, it involves exposure to ionizing radiation and since it requires a fluoroscopy suite it is expensive and can be difficult to schedule. Ultrasound contrast material can be injected through the nephrostomy tube and its passage into the bladder can be assessed with an ultrasound machine. This investigation compares the efficacy of contrast-enhanced ultrasound to conventional fluoroscopy.

My role includes design of the study, particularly power calculation, developing the contrast ultrasound protocol, performing contrast ultrasound procedures, instructing others in performance of the procedure, statistical analysis of results and drafting manuscripts.

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|    |                           |            |                           |                    |
|----|---------------------------|------------|---------------------------|--------------------|
| 6. | R01CA181191               | Consultant | 1 % effort                | Smith-Bindman (PI) |
|    | National Cancer Institute |            | 09/12/2014                | 12/31/2018         |
|    | CT Dose Collaboratory     |            | \$ 904,878<br>direct/yr 1 | \$ 4,816,984 total |

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Computed tomography (CT) is frequently used for medical scanning and can deliver high doses of radiation to patients. Yet because few standards exist for CT examinations, the radiation doses that patients receive during CT vary widely. Routinely, doses are higher than needed for medical diagnoses and high enough to be associated with increased cancer risk. The proposed project is a multisite collaboration studying improved standards for conducting CT, including the radiation doses used, and developing strategies to apply (implement) and spread (disseminate) these standards in different clinics and hospitals. The project will use a mixture of methods including a randomized controlled trial, observational data, and key informant interviews. The work strives to improve CT safety and reduce cancers associated with radiation from CT by lowering the doses that patients receive.

As an expert on abdominopelvic CT, CT dose reduction and applied CT physics, I advise the investigators on presentation of CT dose data and study participants on CT protocols and dose reduction techniques.

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|    |                                                          |       |                             |                    |
|----|----------------------------------------------------------|-------|-----------------------------|--------------------|
| 7. |                                                          | Co-PI | 25 % effort                 | Mongan/Taylor (PI) |
|    | General Electric                                         |       | 10/01/2016                  | 06/30/2018         |
|    | Screening for Dangerous Findings on Chest<br>Radiographs |       | \$ 2,969,452<br>direct/yr 1 | \$ 2,969,452 total |

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This is a sub-award of 10-year \$13 million master agreement with General Electric. This sub-award focuses on using deep learning neural network techniques to identify two common and potentially acutely dangerous conditions seen on chest radiographs: misplaced feeding tubes and pneumothorax. The goal is to create a classifier that would improve patient care in the acute setting by analyzing every radiograph and flagging those that are likely to have one of these findings for priority review by a radiologist.

As Co-PI of this study, my role is to define the clinical question, identify and prepare input data, design the compute infrastructure needed to perform the research, define the approach to creating the classifier, construct a rigorous evaluation of performance, perform statistical analysis of the results, and draft manuscripts.

|    |                                                                                                                           |            |                        |                    |
|----|---------------------------------------------------------------------------------------------------------------------------|------------|------------------------|--------------------|
| 8. | OOS030101                                                                                                                 | Consultant | 1 % effort             | Smith-Bindman (PI) |
|    | PCORI                                                                                                                     |            | 08/01/2015             | 7/31/2020          |
|    | Pragmatic Trial of More versus Less Intensive Strategies for Active Surveillance of Patients with Small Pulmonary Nodules |            | \$ 224,885 direct/yr 1 | \$ 893,707 total   |

Lung nodules are a common finding on CTs that include the lungs. The majority of small nodules are benign, but a small percentage develop malignancies. This investigation seeks to determine the effectiveness of different follow-up strategies in maximizing quality of care.

As an informatics expert, I advise the PI and her team on development of software for decision support, particularly user interface design, and data collection.

|    |                                                                                          |    |                          |                    |
|----|------------------------------------------------------------------------------------------|----|--------------------------|--------------------|
| 9. |                                                                                          | PI | 1 % effort               | Mongan (PI)        |
|    | General Electric                                                                         |    | 01/01/2020               | 07/31/2021         |
|    | Medical Evaluation of the Critical Care Suite on the Optima XR240amx mobile X-Ray system |    | \$ 31,755.48 direct/yr 1 | \$ 31,755.48 total |

I led the development of an AI-based algorithm to detect pneumothorax, published in PLoS: Medicine. GE has licensed this work, implemented it on a portable X-ray machine and obtained FDA clearance for the device. This grant supports integration of the AI-enabled X-ray machine into the clinical PACS to enable worklist prioritization based on AI results and evaluation of the experience of using the AI in a clinical environment.

Negotiate contract, direct informatics integration, analyze results and outcomes, draft whitepaper.

|     |                                                                                                   |    |                      |                |
|-----|---------------------------------------------------------------------------------------------------|----|----------------------|----------------|
| 10. |                                                                                                   | PI | 1 % effort           | Mongan (PI)    |
|     | Radiological Society of North America                                                             |    | 06/01/2022           | 08/20/2022     |
|     | Covid-19 Imaging Data Extraction and Preparation for the Medical Imaging and Data Resource Center |    | \$ 24074 direct/yr 1 | \$ 24074 total |

A major limitation in the ability to develop artificial intelligence to address Covid-19 imaging is the availability of large, well-curated, datasets of medical images of patients with Covid-19 and matched negatives. Imaging outside the respiratory system, including brain and heart, will be of increasing importance as the focus of research turns from diagnosis of acute Covid to understanding and management of long Covid. This grant provides support for locating, extracting, deidentifying and transmitting UCSF Covid-19 imaging data to the MIDRC project

As PI I have ultimate responsibility for the project, including managing IRB approval, supervising the data scientist and providing a clinical perspective on which data to obtain and how to interpret it.

## PEER REVIEWED PUBLICATIONS

1. **Mongan J**. Interactive essential dynamics. J Comput Aided Mol Des. 2004 Jun; 18(6):433-6. PMID: 15663003
2. Hamelberg D, **Mongan J**, McCammon JA. Accelerated molecular dynamics: a promising and efficient simulation method for biomolecules. J Chem Phys. 2004 Jun 22; 120(24):11919-29. PMID: 15268227
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4. **Mongan J**, Case DA. Biomolecular simulations at constant pH. Curr Opin Struct Biol. 2005 Apr; 15(2):157-63. PMID: 15837173
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7. Lewis JA\*, **Mongan J\***, McCammon JA, Cohen SM. Evaluation and binding-mode prediction of thiopyrone-based inhibitors of anthrax lethal factor. ChemMedChem. 2006 Jul; 1(7):694-7. PMID: 16902919 (\* Co-primary authors)
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9. **Mongan J**, Svrcek-Seiler WA, Onufriev A. Analysis of integral expressions for effective Born radii. J Chem Phys. 2007 Nov 14; 127(18):185101. PMID: 18020664
10. **Mongan J**, Rathnayake S, Fu Y, Wang R, Jones EF, Gao DW, Yeh BM. In vivo differentiation of complementary contrast media at dual-energy CT. Radiology. 2012 Oct; 265(1):267-72. PMID: 22778447.
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12. **Mongan J**, Rathnayake S, Fu Y, Gao DW, Yeh BM. Extravasated contrast material in penetrating abdominopelvic trauma: dual-contrast dual-energy CT for improved diagnosis--preliminary results in an animal model. Radiology. 2013 Sep; 268(3):738-42. PMID: 23687174.
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14. **Mongan J**, Kline J, Smith-Bindman R. Age and sex-dependent trends in pulmonary embolism testing and derivation of a clinical decision rule for young patients. *Emerg Med J*. 2015 Mar 9. PMID: 25755270
15. \*Rathnayake S, **Mongan J**, Torres AS, Colborn R, Gao DW, Yeh BM, Fu Y. Rathnayake S, Mongan J, Torres AS, Colborn R, Gao DW, Yeh BM, Fu Y. In vivo comparison of tantalum, tungsten, and bismuth enteric contrast agents to complement intravenous iodine for double-contrast dual-energy CT of the bowel. *Contrast Media Mol Imaging*. 2016 Feb 18. PMID: 26892945 (\*First author was a trainee who I mentored on this project.)
16. \*Li Y, **Mongan J**, Behr SC, Sud S, Coakley FV, Simko J, Westphalen AC. Beyond Prostate Adenocarcinoma: Expanding the Differential Diagnosis in Prostate Pathologic Conditions. *Radiographics*. 2016 Jul-Aug; 36(4):1055-75. PMID: 27315446 (\*First author was a trainee who I mentored on this project.)
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20. Rajkomar A, Lingam S, Taylor AG, Blum M, **Mongan J**. High-Throughput Classification of Radiographs Using Deep Convolutional Neural Networks. *J Digit Imaging*. 2017 Feb; 30(1):95-101. PMID: 27730417. PMCID: PMC5267603
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27. **Mongan J**, Avrin D. Impact of PACS-EMR Integration on Radiologist Usage of the EMR. J Digit Imaging. 2018 Apr 25. PMID: 29696473
28. Taylor AG, Mielke C, **Mongan J**. Automated detection of moderate and large pneumothorax on frontal chest X-rays using deep convolutional neural networks: A retrospective study. PLoS Med. 2018 Nov; 15(11):e1002697. PMID: 30457991. PMCID: PMC6245672
29. Fahimi J, Kanzaria HK, **Mongan J**, Kahn KL, Wang RC. Potential Effect of the Protecting Access to Medicare Act on Use of Advanced Diagnostic Imaging in the Emergency Department: An Analysis of the National Hospital Ambulatory Care Survey. Radiology. 2019 Jan 29; 181650. PMID: 30694161
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33. **Mongan J**, Kohli M. Artificial Intelligence and Human Life: Five Lessons for Radiology from the 737 MAX Disasters. Radiol Artif Intell. 2020 Mar; 2(2):e190111. PMID: 33937819. PMCID: PMC8017379
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35. **Mongan J**, Moy L, Kahn CE. Checklist for Artificial Intelligence in Medical Imaging (CLAIM): A Guide for Authors and Reviewers. Radiol Artif Intell. 2020 Mar; 2(2):e200029. PMID: 33937821. PMCID: PMC8017414
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## BOOKS AND CHAPTERS

1. Programming Interviews Exposed, by **John Mongan** and Noah Suojanen; Wiley, 2000. Second edition by **John Mongan**, Noah Suojanen and Eric Giguere; Wiley, 2007. Third edition by **John Mongan**, Eric Giguere and Noah Kindler; Wiley, 2012. Fourth edition by **John Mongan**, Noah Kindler and Eric Giguere; Wiley 2018. (Over 100,000 copies sold). Republished in China (Simplified Chinese), South Korea (Korean), India (English), Russia (Russian), and Poland (Polish).
2. **Mongan J**. Contributor of 10 cases (approx. 5% of total content) to *Gastrointestinal Imaging Cases*, edited by Angela D. Levy, Koenraad Mortelet and Benjamin M. Yeh; Oxford University Press; 2013.

## SIGNIFICANT PUBLICATIONS

1. Rajkomar A, Lingam S, Taylor AG, Blum M, **Mongan J**. High-Throughput Classification of Radiographs Using Deep Convolutional Neural Networks. *J Digit Imaging*. 2016 Oct 11. PMID: 27730417

This proof-of-concept work was one of the early applications of the current generation of convolutional neural network artificial intelligence techniques to radiological images, demonstrating that very high levels of accuracy can be obtained on simple but non-trivial computer vision problems in medical imaging. I framed the scientific problem, obtained the data sets, set scientific direction, determined analysis strategy, outlined strategy for manuscript, and selected journal for submission.

2. **Mongan J**, Avrin D. Impact of PACS-EMR Integration on Radiologist Usage of the EMR. *J Digit Imaging*. 2018 Apr 25. PMID: 29696473

This investigation quantified the impact of the Radiant integration between Epic/Apex and the PACS software used by radiologists to view imaging on radiologist's use of Apex; it employed security audit logs as a novel data source to understand usage patterns of medical software. I took the lead role in all aspects of this project, including framing the scientific problem; performing literature search; designing the investigation; writing the IRB; collecting, processing and analyzing the data; and drafting the manuscript.

3. Taylor AG, Mielke C, **Mongan J**. Automated detection of moderate and large pneumothorax on frontal chest X-rays using deep convolutional neural networks: A retrospective study. PLoS Med. 2018 Nov; 15(11):e1002697. PMID: 30457991. PMCID: PMC6245672

This was an artificial intelligence development project that aimed to create a pneumothorax detection algorithm with sufficiently high performance to be clinically useful. The work was published in a special artificial intelligence issue of PLoS: Medicine; the intellectual property developed was licensed to GE and has been incorporated into a portable X-ray device. I framed the scientific problem, wrote the software used for annotation of over 10,000 radiographs, organized and analyzed the annotations, directed the data science work of algorithm development, determined the analysis strategy, outlined the strategy for the manuscript, revised and refined the manuscript, selected journal for submission and revised the manuscript based on reviewer and editor comments.

4. **Mongan J**, Kohli M. Artificial Intelligence and Human Life: Five Lessons for Radiology from the 737 Max Disasters. Radiology: Artificial Intelligence. 2020 Mar 18.

This article looks toward the translational implementation of artificial intelligence in clinical medicine and seeks to avoid potential morbidity and mortality from missteps by drawing lessons from recent aviation disasters. I conceived the concept, performed background literature search, drafted four of the five lessons, revised and refined the manuscript and submitted the manuscript.

5. **Mongan J**, Moy L, Kahn CE. Checklist for Artificial Intelligence in Medical Imaging (CLAIM): A Guide for Authors and Reviewers. Radiology: Artificial Intelligence. 2020 Mar 25

This article describes a checklist developed to improve the quality of publications on artificial intelligence in medical imaging by identifying key pieces of information that must be included and indicators of quality of research. It has been adopted by the journal Radiology: Artificial Intelligence as a mandatory part of the submission process for all original research articles. I identified the need for the checklist, drafted the first outline, worked with coauthors to develop all the points of the checklist, and edited and revised the final manuscript.

## PATENTS ISSUED OR PENDING

1. 6,189,116: Complete, Randomly Ordered Traversal of Cyclic Directed Graphs. **John T. Mongan** and Dorothy M. Cribbs.
2. 6,304,982: Network Distributed Automated Testing System. **John T. Mongan**, Dorothy M. Cribbs and John R. DeAguiar.
3. 6,378,088: Monte Carlo Automated Test Generator. **John T. Mongan**.

## CONFERENCE ABSTRACTS

1. \* "Constant pH Molecular Dynamics in Generalized Born Implicit Solvent" 229th American Chemical Society National Meeting in San Diego, California. **John Mongan**, David A. Case. (Delivered formal oral presentation)
2. "Methods for Radiation Dose Reduction in Abdominopelvic CT Imaging." Annual Meeting of the Radiological Society of North America Chicago, Illinois. **John Mongan**, Rizwan Aslam, Fergus Coakley, Robert Gould, John Shepherd, Benjamin Yeh. (poster, selected for CME credit)

3. \* "Trauma Imaging with Color Contrast for Color CT: In Vivo Use of Complementary Contrast Materials at Dual-energy Computed Tomography" **John Mongan**, Samira Rathnayake, Yanjun Fu, Benjamin Yeh. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (Delivered formal oral presentation)
4. "Improving Efficiency of Pulmonary Embolism Testing in Young Female Patients" **John Mongan**, Jeffrey Kline, Rebecca Smith-Bindman. Annual Meeting of the Radiological Society of North America in Chicago, Illinois. (poster, alternate for oral presentation)
5. \* "Dual Contrast Dual-Energy CT in Imaging of Penetrating Abdominal Trauma" **John Mongan**, Samira Rathnayake, Yanjun Fu, Benjamin Yeh. Contrast2013 Contrast Media Research Symposium Beijing, China. (Delivered formal oral presentation)
6. "Beyond Prostate Cancer: Expanding the Differential Diagnosis in Prostate Pathology" Yi Li\*\*, **John Mongan**, Spencer Behr, Seema Sud, Fergus Coakley, Jeff Simko, Antonio Westphalen. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (poster; selected for Radiographics publication and CME credit. First author was a trainee mentored and supervised by me)
7. "The Radiologist's Workflow Environment: Evaluation of Disruptors and Potential Implications" JP Yu, Akash Kansagra, **John Mongan**. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (Formal oral presentation)
8. "Computerized Provider Order Entry (CPOE) as a Cause of Errors in Imaging Requests: What a Difference a Space Makes" **John Mongan**, Aaron Neinstein, Christopher Jovais, Spencer Behr. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (poster; selected for CME credit)
9. \*\* "Correlate: A PACS and EMR-integrated Tool which Leverages Natural Language Processing (NLP) to Provide Automated Clinical Follow-up for the Radiologist" Mark D. Kovacs, Joseph Mesterhazy, David E. Avrin, Thomas H. Urbania, **John Mongan** Annual Meeting of the Radiological Society of North America Chicago, Illinois. (poster; selected for CME credit. First author was a trainee mentored and supervised by me)
10. "Improving Automated Clinical Follow-up Through Optimization of Natural Language Processing (NLP) Methods" Mark D. Kovacs, Joseph Mesterhazy, David E. Avrin, Thomas H. Urbania, **John Mongan**. Annual Meeting of the Society for Imaging Informatics in Medicine, Portland, Oregon
11. "Context integration of EMR (electronic medical record) with PACS increases radiologist use of EMR" **John Mongan**, David Avrin. Annual Meeting of the Society for Imaging Informatics in Medicine, Portland, Oregon
12. "Decision Support Tool in an EMR Improves Ordering" Ellen Weber, Ralph Wang, **John Mongan**, et al. Royal College of Emergency Medicine Annual Scientific Conference, Bornemouth, United Kingdom.
13. "Feasibility of antegrade contrast-enhanced ultrasound nephrostograms" Manint Usawachintachit, **John Mongan**, Stefanie Weinstein, Thomas Chi. World Congress of Endourology. Cape Town, South Africa.
14. \*\* "Targeted QA: Creating a PACS based Teaching File using Pareto Analysis of Trainee Discrepancies" Hriday Shah, **John Mongan**, Eric Ehman, Javier Villanueva-Meyer, Soonmee Cha, Jason Talbott. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (Formal oral presentation)

15. \*\* "A Shiny New World: Creating Your Own Radiology Decision Support Webapps Using R" Jennifer Wan, **John Mongan**, David Incerti, Jesse Courtier. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (poster; selected for CME credit)
16. \*\* "Clinical Decision Support and Appropriate Use Criteria: Complying with PAMA while Improving Usefulness of Imaging" Matthew Barkovich, Marc Kohli, William Dillon, Rebecca Smith-Bindman, **John Mongan**. Annual Meeting of the Radiological Society of North America Chicago, Illinois.
17. \*\* "Convolutional Neural Networks: Fundamental Theory and Guided Implementation for the Radiologist Using Google Collaboratory" Alex Chan, Spencer Behr, **John Mongan**. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (poster; selected for Radiographics publication. First author was a trainee mentored and supervised by me.)
18. "Synthetic Post-contrast Breast MRI for Imaging Malignant Lesions Using Deep Learning" Maggie Chung, Evan Calabrese, Kimberly Ray, Tatiana Kelil, Genevieve Woodard, Nola Hylton, **John Mongan**, Bonnie Joe, Amie Lee. Annual Meeting of the Radiological Society of North America Chicago, Illinois. (poster)
19. "Building an expertly annotated multi-institution dataset for machine learning: experience from RSNA Challenges" Felipe Kitamura, Erol Colak, Tyler Richards, Kathy Andriole, Safwan Halabi, Luciano Prevedello, Adam Flanders, **John Mongan**. Annual Meeting of the Radiological Society of North America Chicago, Illinois.
20.
  - \* Formal oral presentation by me
  - \*\* First author was a trainee mentored and supervised by me

## ACADEMIC LEADERSHIP

My primary academic leadership role is serving **Associate Chair, Translational Informatics** for Radiology and Biomedical Imaging. In conjunction with the Associate Chair, Clinical Informatics, I **lead the Imaging IT group, consisting of approximately 25 FTE**, including three full-time IT directors who jointly report directly to us.

I have created a **comprehensive infrastructure for artificial intelligence** work in radiology. Building on earlier success in the creation of the Automated Image Retrieval (AIR) platform, which provides web-based self-service access to deidentification and extraction of image data files from the clinical PACS archive, I directed the **expansion in functionality of AIR** to include more flexible deidentification profiles and the extraction and deidentification of radiology reports. Two additional AIR instances are **deployed at the SF VAMC and ZSFG**, providing image data file access across all medical centers staffed by UCSF faculty. I negotiated a **co-funding agreement with UCD Radiology** and we have installed an instance at UCD as well. Recognizing a common need for efficient annotation of images, I negotiated a reduced-price contract for the **MD.ai cloud-based annotation** platform which has found wide application within the department for AI projects as well as traditional imaging investigations requiring multi-center reads. I led an **overhaul of the hardware infrastructure** managed by Radiology Scientific Computing Services, including **transitioning storage** from unreliable consumer-grade equipment to a NetApp storage device, **consolidating data back-up** at Parnassus to increase efficiency and **dramatically increasing GPU compute** capacity, including purchase and deployment of a 16-GPU NVIDIA DGX-2 server. In parallel with hardware infrastructure, I have directed a modernization of our research software infrastructure including **GPU-enabling our compute scheduling** system and containerizing our AI and GPU

frameworks. Looking toward clinical deployment of AI, I led the selection, purchase and implementation of a **DICOM router system**, which allows rules to be created for **automatically forwarding selected imaging data to AI** processing pipelines as soon as it is scanned.

Recognizing the importance of sharing experience and leveraging scale for value across UC, I **continue to organize regular UC Radiology Informatics** meetings with my Radiology informatics counterparts at the other four UC medical campuses. We have been meeting regularly for almost 6 years. At these meetings, we discuss current and potential shared UC-wide projects (including enterprise imaging, clinical decision support, AIR and UC-wide PACS) and share lessons learned and successful strategies for addressing the similar challenges that we face at each of our campuses.

In conjunction with Marc Kohli, Director of Clinical Informatics I **continue to supervise the IT and informatics infrastructure of the Department of Radiology and Biomedical Imaging**. This includes the newly updated clinical PACS systems (Visage Viewer, Nuance Workflow Orchestration and Communicator, DynaCAD for prostate and breast MR, MIM for general nuclear medicine), the Epic Radiant RIS system, Powerscribe 360 dictation, Enterprise Imaging (eUnity "webpacs" viewer software and UC-wide vendor-neutral archive), two Radiology data centers (including multi petabyte storage systems, virtualized compute servers and backup systems), network and firewall equipment, a research computing cluster, and a variety of educational software systems (UCSF teaching file server, "wet-read" preliminary report system, and mPower report search and analytics tool). My responsibilities include strategic planning, personnel decisions, budgeting, and prioritization. I have weekly meetings with the Imaging IT group (25 FTE), twice monthly meetings with the Scientific Computing Services (3, soon to be 4 FTE) group and direct interaction by phone and email with these groups multiple times per day.

## OTHER CREATIVE ACTIVITIES

### 1. SOFTWARE

2. AMBER 8. D.A. Case, T.A. Darden, T.E. Cheatham, III, C.L. Simmerling, J. Wang, R.E. Duke, R. Luo, K.M. Merz, B. Wang, D.A. Pearlman, M. Crowley, S. Brozell, V. Tsui, H. Gohlke, **J. Mongan**, V. Hornak, G. Cui, P. Beroza, C. Schafmeister, J.W. Caldwell, W.S. Ross, and P.A. Kollman. 2004. <http://ambermd.org>
3. Interactive Essential Dynamics 2.0. **John Mongan**. July 2004. <http://mccammon.ucsd.edu/ied>
4. AMBER 9. D.A. Case, T.A. Darden, T.E. Cheatham, III, C.L. Simmerling, J. Wang, R.E. Duke, R. Luo, K.M. Merz, D.A. Pearlman, M. Crowley, R.C. Walker, W. Zhang, B. Wang, S. Hayik, A. Roitberg, G. Seabra, K.F. Wong, F. Paesani, X. Wu, S. Brozell, V. Tsui, H. Gohlke, L. Yang, C. Tan, **J. Mongan**, V. Hornak, G. Cui, P. Beroza, D.H. Mathews, C. Schafmeister, W.S. Ross, and P.A. Kollman. 2006. <http://ambermd.org>
5. AMBER 10. D.A. Case, T.A. Darden, T.E. Cheatham, III, C.L. Simmerling, J. Wang, R.E. Duke, R. Luo, M. Crowley, R.C. Walker, W. Zhang, K.M. Merz, B. Wang, S. Hayik, A. Roitberg, G. Seabra, I. Kolossváry, K.F. Wong, F. Paesani, J. Vanicek, X. Wu, S.R. Brozell, T. Steinbrecher, H. Gohlke, L. Yang, C. Tan, **J. Mongan**, V. Hornak, G. Cui, D.H. Mathews, M.G. Seetin, C. Sagui, V. Babin, and P.A. Kollman. 2008. <http://ambermd.org>

**6. Ultrasound-guided biopsy curriculum**

Recorded one hour lecture illustrating step by step procedure for preparing patient and performing successful ultrasound guided biopsies. This is required viewing for each resident prior to starting the Mt. Zion Abdominal Imaging rotation.