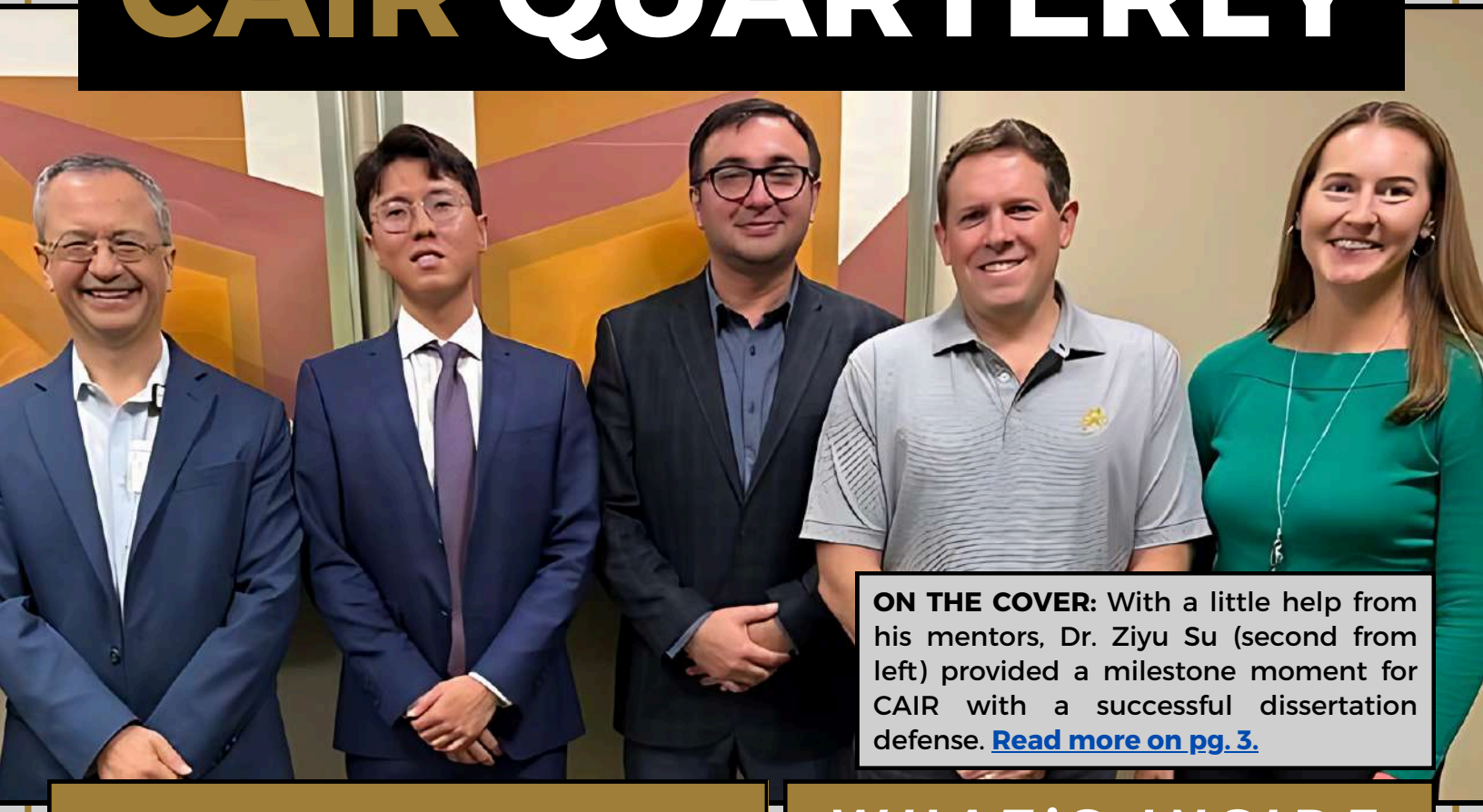
Winter 2025

CAIR QUARTERLY



ON THE COVER: With a little help from his mentors, Dr. Ziyu Su (second from left) provided a milestone moment for CAIR with a successful dissertation defense. Read more on pg. 3.

Is AI in Your New Year's Resolutions?

Director's Note from Dr. Metin Gurcan

As we move further into 2025, I invite you to reflect on this: Is AI part of your New Year's resolutions? Whether you are a clinician, healthcare provider, researcher, student, staff member, or industry partner, artificial intelligence is transforming the future of healthcare. **Now is the perfect time to get involved.**

The past year has been nothing short of remarkable for CAIR. We celebrated our first anniversary with a community of more than

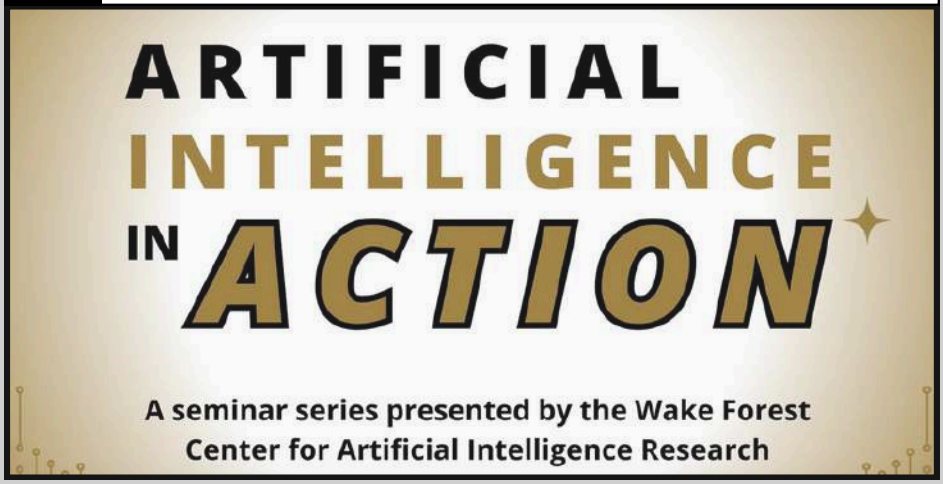
Continued on page 2

WHAT'S INSIDE

All "Artificial Intelligence in Action" Seminars Are Now on YouTube!

Missed one of our AI-IA seminars? No worries! Every seminar is now on YouTube, so you can stream exclusive insights that advance your understanding of how AI is revolutionizing healthcare. On our channel (@WakeForestAI), you'll also find new content including faculty interviews and coverage of recent events. Happy streaming! 🤖 🍿

Click here to view the full archive of AI-IA seminars:



Click here to watch the New Faculty Spotlight on Dr. Arezoo Movaghar:

ALSO INSIDE

Have You Seen?

We created a CALIBIR Summer Research Internship page to provide extensive details about this wonderful opportunity for students interested in medical AI.

Check It Out

Time to Celebrate!

Starting March 4, the Wake Forest School of Medicine will host **Celebrate Research! 2025**, a month-long showcase of groundbreaking research and innovation across Advocate Health.

View the Full List of Events

FOLLOW @wakeforestai

To stay updated on CAIR research, events, and more!

Director's Note
(continued)

400 members and a growing network of collaborators. We supported groundbreaking research through pilot grants, travel awards, and new funding opportunities. Our **AI in Action (AI-IA) Seminar Series expanded significantly**, now offering Continuing Medical Education (CME) credits to equip healthcare professionals with the latest advancements in AI. We also strengthened our partnerships with the Wake Forest Critical Illness, Injury, and Recovery Research Center, the Wake Forest Center for Remote Health Monitoring, and Northeastern University's Institute for Experiential AI, fostering impactful cross-disciplinary research.

Our commitment to education continues to flourish. The **"AI for Future Clinicians" Workshop**, co-hosted with our student chapter, the Future of Artificial Intelligence Research (FAIR), introduced medical students to AI's role in patient care. Our **build-a-thon event** challenged students to create **AI-driven solutions for mental health**, proving that innovation starts with curiosity and collaboration. Meanwhile, our summer internship programs provided hands-on research experience, equipping students with essential AI and biomedical informatics skills.

Metin Gurcan, PhD

Looking ahead, 2025 promises even greater opportunities for learning and discovery. We are expanding our workshop offerings, launching new funding initiatives, and creating additional spaces for collaboration between researchers, clinicians, and industry leaders. Whether through participating in AI-driven research, attending our seminars, or engaging in mentorship and training programs, there are countless ways to integrate AI into your professional growth.

I invite you to make 2025 the year you **deepen your connection with AI** – explore new projects, **attend our events**, and join us in shaping the future of AI-driven healthcare. Let's build on our successes and continue pushing the boundaries of innovation together.

Wishing you a year of discovery, collaboration, and success.

Warmest regards,

Dr. Metin Gurcan
Director, Center for Artificial Intelligence Research
Senior Associate Dean, Artificial Intelligence
Wake Forest University School of Medicine

IN THE SPOTLIGHT

Dr. Ziyu Su Becomes CAIR's First PhD Graduate

The Wake Forest Center for Artificial Intelligence Research (CAIR) is proud to announce a historic milestone: the successful PhD defense and graduation of its first doctoral student, **Dr. Ziyu Su**.

Ziyu Su, PhD

Dr. Su's dissertation, "Theory and Design of Interpretable Weakly Supervised Learning Methods: Application to Breast Cancer Histopathology," is an example of innovative and impactful research conducted at CAIR.

Dr. Su's research addressed one of the most pressing challenges in medical AI: developing reliable and interpretable models for histopathological analysis. Leveraging weakly supervised learning methods and the Multiple Instance Learning (MIL) paradigm, his work addressed the inherent challenges of whole-slide imaging in breast cancer diagnosis and prognosis. Dr. Su's novel approaches yielded state-of-the-art results in identifying breast cancer lymph node metastases and predicting Oncotype-DX recurrence risk — advancing AI tools that are both accurate and clinically interpretable.

Dr. Su began his PhD journey in 2020 and was a member of CIALAB (Clinical Image Analysis Lab) at CAIR. He was mentored by **Metin Gurcan, PhD** and **Khalid Niazi, PhD**, and also received invaluable guidance from **Ashley Weaver, PhD**, **Gary H. Tozbikian, MD**, **Sang Jin Lee, PhD**, and **Scott Gayzik, PhD**. Their collective expertise and mentorship reflect CAIR's commitment to fostering innovation in healthcare AI.

"Ziyu's success exemplifies CAIR's mission to advance the science and application of AI in healthcare through cutting-edge research and education as well as our dedication to health equity," Dr. Gurcan says. "As our first CAIR PhD graduate, his achievements set a high benchmark for future scholars."

Dr. Su's accomplishments highlight CAIR's dedication to preparing the next generation of AI leaders. As he embarks on his professional career, CAIR looks forward to seeing his continued impact on the field of AI in healthcare.

TRAINING

IN THE SPOTLIGHT

CAIR Holds First-Ever "AI for Future Clinicians" Workshop

Event co-hosted with CAIR's student chapter gave aspiring medical professionals the chance to explore AI's transformative role in healthcare

A ONE-OF-A-KIND EDUCATIONAL EVENT TOOK PLACE EARLIER THIS MONTH, THE RESULT OF A collaborative effort between the Wake Forest Center for Artificial Intelligence Research (CAIR) and its enterprising student chapter, the Future of Artificial Intelligence Research (FAIR).

The inaugural "AI for Future Clinicians" Workshop, held Feb. 6 at the Bowman Grey Center for Medical Education in Winston-Salem, NC, was designed for students without a technical background, giving the attendees a chance to discover how AI is shaping the future of healthcare and learn from experts who are pioneering novel applications.

The workshop marked the most significant collaboration between CAIR and FAIR to date. Event planning was spearheaded by **Hindo Kamanda**, **Eric Proctor, and David Rezko**, three Wake Forest School of Medicine students who comprise FAIR's MD Subcommittee.

"We think it's important to have events such as these because we don't want our peers to be intimidated by AI technology. We'd like for them to feel empowered to use it as a tool that can help them become better clinicians who serve their patients holistically. So, it's exciting that so many of them want to learn more and are taking the steps to do so," the subcommittee said in a joint statement.

Dr. Oguz Akibilgic explained how AI can be used to analyze ECG data for the prediction of cardiovascular diseases.

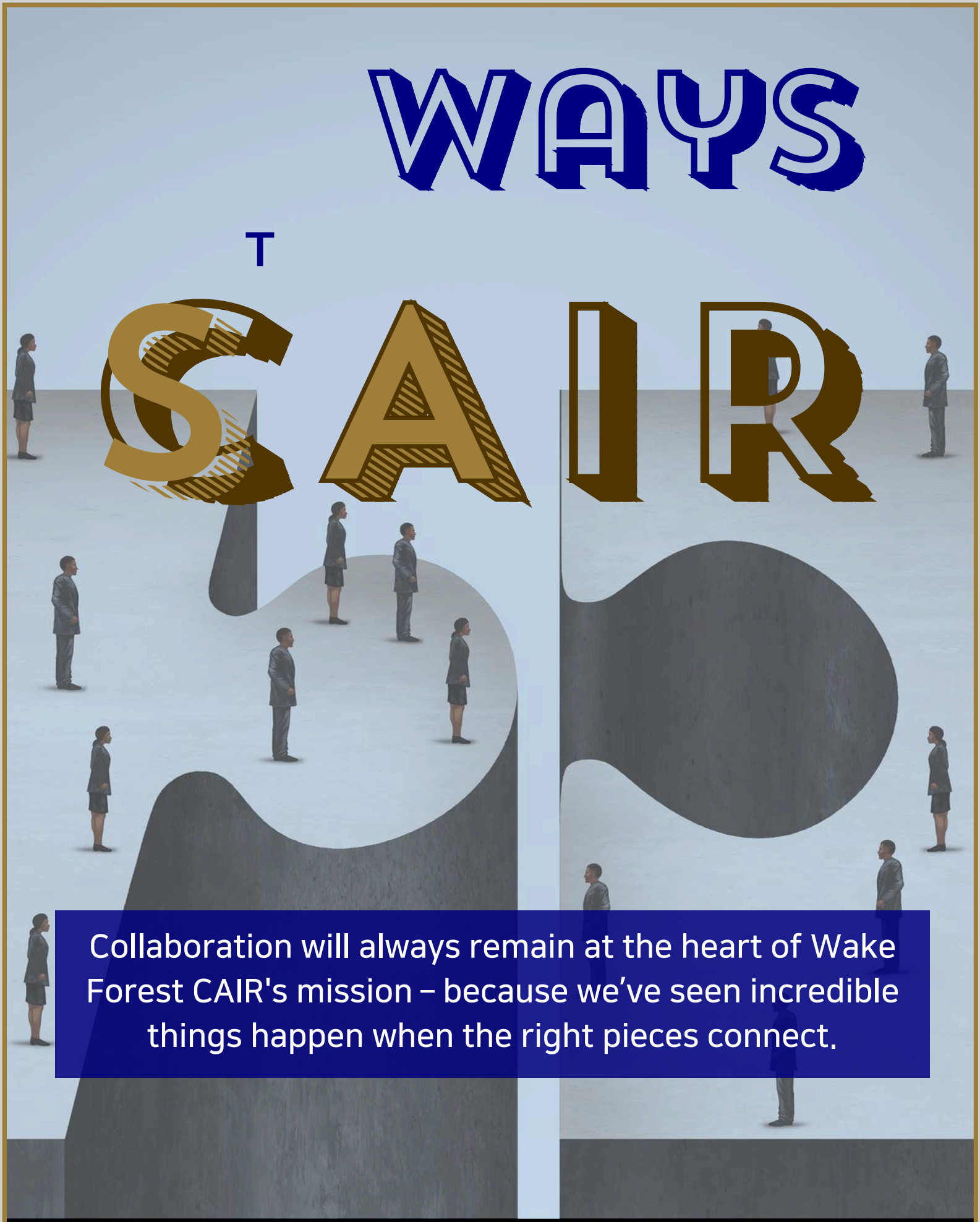
The event featured experts from CAIR and Atrium Health, including:

- CAIR faculty member **Oguz Akbilgic, PhD**, who kicked things off with a presentation covering the fundamentals of AI, its current applications in healthcare, and its efficacy in areas like heart failure risk prediction.
- **Brad Rowland, MD, Adam Moses, MHA, PMP, FAMIA**, and CAIR faculty member **Eric Kirkendall, MD, MBI**, gave an overview of AI's expanding role in healthcare operations. They explained how AI is being integrated into clinical workflows at Atrium Health and covered best practices for responsible deployment.
- **Sean Catley, MPH**, shared his innovative research, *Artificial Intelligence Enhanced Otoscopy – A Rated Approach to Image Generation* (*RatedStitch*), which aims to enhance the digital otoscope as a diagnostic tool. Mentored by CAIR Director **Metin Gurcan, PhD**, Sean showcased his work at the Wake Forest University School of Medicine's Medical Student Research Day and secured third place.

Adam Moses (left) and Dr. Brad Rowland highlighted some of the ways AI is deployed in clinical settings at Atrium Health Wake Forest Baptist.

CAIR expresses its deepest gratitude to each of the speakers for sharing their time and expertise. Special thanks are also due to the FAIR MD Subcommittee as well as FAIR's president, **Robert Bennett**, who has shown tremendous dedication to growing the student organization. Students who are interested in joining FAIR should email fair@wakehealth.edu for more information.

WAYS T CAIR



Collaboration will always remain at the heart of Wake Forest CAIR's mission – because we've seen incredible things happen when the right pieces connect.

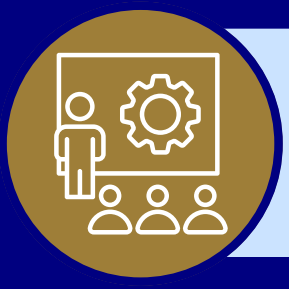
Artificial intelligence has ushered in a new era of medicine, making collaboration among clinicians, researchers, and educators more critical than ever. By sharing expertise and resources, they can drive healthcare innovation, fuel scientific discovery, and effectively navigate the challenges of AI implementation. From research partnerships and mentorship programs to clinical data integration and policy advocacy, here are 10 impactful ways to engage with Wake Forest CAIR and advance AI in medicine.

Collaborative Research Projects:

Partner with CAIR faculty to co-develop and lead AI-driven research initiatives addressing pressing clinical challenges

Pilot Grant Applications:

Collaborate on applying for joint pilot funding opportunities, leveraging CAIR's expertise to develop competitive proposals

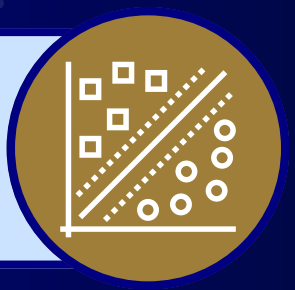


Grand Rounds and Workshops:

Invite CAIR experts to present at Grand Rounds and department meetings, or organize joint workshops on integrating AI into clinical workflows

Clinical Data Integration:

Work with CAIR to utilize clinical data for predictive analytics, risk stratification, and patient outcome improvements



Joint Clinical Trials:

Partner with CAIR on clinical trials utilizing AI for patient recruitment, monitoring, or innovative intervention strategies

Educational Opportunities:

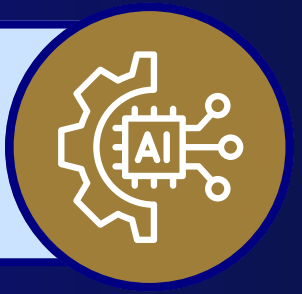
Encourage clinical faculty and staff to participate in CAIR-hosted short courses, seminars, or training programs on AI and its clinical applications

Mentorship for Trainees:

Collaborate with CAIR to mentor medical students, residents, and fellows in AI-focused research projects and initiatives

Custom AI Solutions:

Identify department-specific pain points that CAIR can address through custom AI tools, such as decision-support systems



Community Engagement and Outreach:

Collaborate on initiatives that use AI to address health disparities in your region, demonstrating joint commitment to equitable healthcare

Policy Development and Advocacy:

Work with CAIR on the ethical, legal, and operational considerations for implementing AI in healthcare, contributing to institutional policy-making

COLLABORATION IN ACTION

A Joint Pilot Program with the UNC-Charlotte AI4Health Center

Wednesday, March 5, 2-4 p.m. EST

Wake Forest Biotech Place, Auditorium 151
575 Patterson Ave., Winston-Salem, NC 27101

Hosted by the **Wake Forest Center for Artificial Intelligence Research** and the **UNC-Charlotte AI4Health Center**, this event will spotlight novel AI methodologies that are being used to transform healthcare. The agenda includes:

- **Flash talks from clinicians and researchers**
- **Breakout Q&A and networking sessions**
- **Details on a $50,000 joint pilot award**

Want to present?

Send us an email and share an idea that could be proposed in a pilot study!

FOR MORE INFORMATION, CONTACT: cair@wakehealth.edu
LEARN MORE ABOUT CAIR AT: school.wakehealth.edu/cair

CAIR
CENTER FOR ARTIFICIAL INTELLIGENCE RESEARCH

TOAST TO GROWTH: Dr. Metin Gurcan welcomed attendees to a festively decorated atrium at Wake Forest Biotech Place for a special event commemorating CAIR's first year as an academic research center.

CAIR Rings in First Anniversary with Year-End Celebration

STARTING AN ACADEMIC RESEARCH CENTER IS NO SMALL FEAT. **METIN GURCAN, PHD**, THE FOUNDING Director of the Wake Forest Center for Artificial Intelligence Research (CAIR), will be the first to tell you that.

Since launching CAIR in October of 2023, he and a team of accomplished faculty, innovative researchers, and dedicated support staff have been working to establish the center as a leader in the pioneering and trustworthy application of AI in healthcare.

Fifteen months later, it was time for a well deserved break. In early December, CAIR held a celebration for its first anniversary in the atrium of Wake Forest Biotech Place, inviting its members and supporters from across Atrium Health Wake Forest Baptist to join CAIR faculty and staff for an evening of fellowship and fun.

The event began with opening remarks from Dr. Gurcan, during which he introduced the newest faculty and staff members. He also recapped the 25 events held since the center's launch – including 15 "Artificial Intelligence in Action" seminars in 2024 alone – and emphasized that the year's growth and achievements would not have been possible without the support of numerous collaborators from the Wake Forest School of Medicine (WFUSM) and beyond.

"We are tremendously grateful to Northeastern University, the Wake Forest CIIRRC (Critical Illness, Injury and Recovery

Research Center), and the Wake Forest Center for Remote Health Monitoring for partnering with us on some very exciting events and funding initiatives," Dr. Gurcan says. "Interdisciplinary collaboration is an important part of what we do at CAIR, and we are planning much more of it in the future."

Following Dr. Gurcan's remarks, attendees enjoyed a catered selection of small plates and desserts. The event featured an assortment of games and activities, including live caricature sketches by Greensboro-based artist Erik Huffine.

As CAIR enters its second year, it plans to bolster funding programs to empower AI investigators and drive advancements in patient care. The center also aims to expand its educational offerings, creating more opportunities for clinicians, researchers, and students to explore AI's potential in medicine.

"The growth that we've experienced could not have happened without our incredible CAIR community," Dr. Gurcan says. "We look forward to repaying their steadfast support with a redoubled commitment in 2025 to promote AI in healthcare through novel research, engaging events, and strong partnerships."

Caricaturist Erik Huffine brought many smiles to the event with his personalized depictions of attendees.

Project managers from CAIR and the Wake Forest Department of Biomedical Engineering put their Jenga skills to the test.

Shekhar Singh, PhD (left), a postdoctoral research fellow at WFUSM, catches up with Ibrahim Karabayir, PhD, Assistant Professor of Cardiovascular Medicine.

Dr. Ashish Khanna Named Recipient of 2025 Collaborative Innovation in AI Award

Ashish K. Khanna, MD, FCCP, FCCM, FASA, Professor of Anesthesiology at the Wake Forest School of Medicine, was named the winner of CAIR's inaugural Collaborative Innovation in AI Award, an annual grant that provides $40,000 in funding to cutting-edge medical research that involves an industry collaborator.

Ashish K. Khanna, MD

Carolyn Huffman, PhD

Bradley Rowland, MD

Megan Hicks, MD

Dr. Khanna and his research team – including **Bradley Rowland, MD**, **Carolyn Huffman, PhD**, and **Megan Hicks, MD** – received the funding for their study, "Reducing Alarm Fatigue in Non-ICU Wards: An AI-Powered Solution for Smarter Monitoring," which was conducted in partnership with **WARD 24/7**, a digital health company based in Copenhagen, Denmark.

Many hospitals use wearable tech to monitor patients' vital signs continuously, but too many false and unnecessary alerts can overwhelm clinicians, making it harder to catch real emergencies.

To make patient monitoring more efficient, Dr. Khanna's team is testing an AI-powered system called WARD CSS (Clinical Support System), which was developed by the Danish firm. The system filters out irrelevant alerts and helps detect real warning signs earlier, which the researchers hope will improve clinician response times and ultimately save lives.

"The results have the potential to revolutionize continuous patient monitoring in non-intensive care settings, offering a scalable, effective solution to improve outcomes while reducing the burden on healthcare providers," Dr. Khanna says. "As an academic learning health system that has pioneered the implementation of continuous ward monitoring, we hope that we will now also pioneer the future integration of AI-based tools with ward monitoring to further enhance patient safety and useability of these tools in routine clinical practice."

Please join CAIR in congratulating Dr. Khanna and his team on this well-deserved recognition. We look forward to seeing the impact of their work in the years to come.

Dr. Ibrahim Karabayir Wins Joint Pilot Award from Wake Forest CIIRRC and CAIR

Ibrahim Karabayir, PhD, Assistant Professor of Cardiology and CAIR faculty member, was named the winner of the inaugural joint pilot award from the Wake Forest Center for Artificial Intelligence Research (CAIR) and the Wake Forest Critical Illness, Injury and Recovery Research Center (CIIRRC).

Dr. Karabayir has been awarded $30,000 to lead an innovative research project titled, "CG-AI for Predicting Short-Term Mortality and Myocardial Infarction in Emergency Department (ED) Chest Pain Presentations," of which he is the principal investigator. **Oguz Akbilgic, PhD**, **Simon Mahler, MD**, and **Nicklaus Powell Ashburn, MD**, are serving as co-investigators.

Ibrahim Karabayir, PhD

These researchers have developed an AI model that uses electrocardiogram (ECG) data to detect elevated troponin levels, a key indicator of heart attacks. Building on this work, they aim to develop a faster, automated tool that integrates ECG, troponin, and simple clinical factors to improve heart attack risk prediction and support clinical decision-making.

Dr. Karabayir joined CAIR as a faculty member in the summer of 2024. In **this brief video**, he provides an overview of his research program and shares his long-term objectives.

Wake Forest CAIR partnered with the Wake Forest Critical Illness, Injury and Recovery Research Center (CIIRRC) to host a joint pilot collaboration event on Aug. 29. Researchers from both centers shared insights through brief presentations, highlighting novel AI and machine-learning applications in critical care. If you missed the event, you can check out the highlights in **this recap video**.

CAIR is proud to collaborate with Wake Forest CIIRRC in funding this impactful research and looks forward to seeing how it will advance AI applications in healthcare.

New Method for Eye Tumor Detection Pioneered by Dr. Mohammad Moghimi's Team

CAIR faculty member **Mohammad Moghimi, PhD**, and his research group have pioneered a new method for eye tumor detection, **as detailed in npj Biosensing**, a journal in the Nature Portfolio.

The study introduces a novel method to identify tissues mimicking cancer tumors inside the eye, which is "an essential step for early detection and monitoring of intraocular tumors, especially uveal melanoma that can result in vision loss and death," Dr. Moghimi says.

This new method, he explains, facilitates the collection of high-quality data from intraocular tumors, paving the way for AI-based cancer prediction and monitoring.

Mohammad Moghimi, PhD

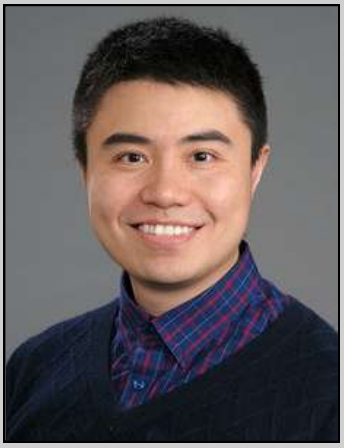
The abstract reads:

Uveal melanoma is the most common primary intraocular cancer in adults and is an aggressive malignancy with risk to vision and survival. Early detection and timely management of tumors may help preserve vision and reduce mortality rate but is challenging as many tumors are asymptomatic until they become large. Here, we studied the electrical properties of eyes to investigate a novel method for potentially detecting small intraocular tumors. We used finite element analysis to simulate the impact of uveal melanoma tumors on electrical impedance and current density in eye models. We also measured the impedance and current flow in the presence of inserted tissue simulating an intraocular tumor in enucleated bovine eyes and eyes in bovine head ex vivo. Our results showed that a 5 mm-diameter mass was detected inside a 32-mm diameter bovine eye by the impedance analyzer.

Dr. Moghimi joined the Wake Forest School of Medicine as an Assistant Professor of Biomedical Engineering in the summer of 2024. He leads a research group that develops wearable devices, medical microsystems, and flexible bioelectronics, holding the early detection of cancer among his principal research interests. CAIR is proud of Dr. Moghimi's impactful work and congratulates him and his team for making this big step toward improving outcomes for patients with eye tumors.

Deep Learning Advances Neuroimaging, but Obstacles Remain: Dr. Da Ma

Thanks to deep learning, brain imaging has advanced significantly in helping detect and diagnose tumors, Alzheimer's disease, and mental disorders. There are hurdles to clear, however, before AI-driven neuroimaging can be fully trusted in clinical settings.



Da Ma, PhD

This is the sentiment of an **editorial for Frontiers in Neuroscience** written by CAIR faculty member **Da Ma, PhD**, and two co-investigators, **Hao Zhang, PhD**, of Central South University in Hunan, China and **Lei Wang, PhD**, of the Ohio State University Wexner Medical Center.

The researchers emphasize the use of various neuroimaging modalities and advanced neural network architectures (i.e. convolutional neural networks, graph neural networks, vision transformers), saying they aid in differentiating brain tumors, dementia subtypes, and neuropsychiatric conditions, and assist in early detection of Alzheimer's and epilepsy.

The researchers note that despite promising results, challenges like data heterogeneity, interpretability, and the need for multi-modal integration remain. The editorial calls for comprehensive evaluations, incorporation of non-imaging biomarkers, and advanced explainable AI approaches to enhance clinical translation and trustworthiness.

Dr. Ma, an Assistant Professor of Gerontology and Geriatric Medicine, has contributed extensively to the field of AI-driven brain imaging, working to make machine-learning models more interpretable, reliable, and clinically useful.

More recently, he was part of a research team that developed a machine learning-based dementia score combining brain MRI scans and genetic data to predict an individual's risk of developing Alzheimer's disease. The study found genetic data was more effective in predicting dementia progression in cognitively normal individuals, whereas MRI data provided better insights for those with mild cognitive impairment. By integrating both data types, Dr. Ma and his colleagues enhanced predictive accuracy, demonstrating the complementary role of genetics and neuroimaging in assessing Alzheimer's risk.

CAIR Faculty Member Dr. Stephen Downs Takes 3rd Prize at Software Competition

Stephen M. Downs, MD, Professor of Pediatrics and CAIR faculty member, brought home third prize at an international software competition for his CHICA software. The 2024 FHIR (Fast Healthcare Interoperability Resources) App Competition, jointly hosted by the American Medical Informatics Association (AMIA) and Health Level Seven (HL7), was held at the AMIA 2024 Annual Symposium in San Francisco on Nov. 12.

The competition featured real-world software applications that use the HL7 FHIR interface standard to connect to electronic medical records (EMR) and provide help in the clinical setting. From all competition entries, experts and developers from AMIA and HL7 selected nine finalists to present their software applications.

Dr. Downs presents his CHICA software system during the FHIR App Competition at AMIA's 2024 Symposium.

The CHICA (Child Health Improvement through Computer Automation) software was developed by Downs and colleagues from Indiana University and Wake Forest University. The system collects health-risk data from children and families in pediatric waiting rooms and generates an agenda for the visit that is displayed to the physician in the EMR. CHICA collects data from both the family and the physician that can be used to guide care at future visits.

"There are too many guideline recommendations for pediatricians to complete in a typical office visit," Downs says. "CHICA pre-screens families for risks and uses a unique prioritization scheme to make sure patients receive the services that are most important for them. CHICA has been studied for almost two decades and shown to improve care."

Downs and his colleagues are pursuing funding to make CHICA widely available in the Advocate Health system.

To learn more about CHICA, listen to Dr. Downs provide a walkthrough of how the software works in the clinical setting.

CAIR Recognizes Project Manager Brittany Jones as She Begins New Chapter

Wake Forest CAIR has come a long way since its founding in the fall of 2023, thanks in no small part to two dedicated project managers who drive the center's operational success.

Serving as the engines of CAIR's day-to-day administration, **Latrice Harris** and **Brittany Jones** have worked closely to optimize budgets, facilitate new-hire onboarding, and expand the center's lineup of scientific seminars and flagship events.

Brittany Jones

They have also helped forge connections across the Wake Forest School of Medicine, Atrium Health Wake Forest Baptist, and many institutions around the globe, strengthening CAIR's network in support of its mission to advance AI applications in healthcare.

In late January, Brittany transitioned to a new role in grants administration at Cone Health in Greensboro. While her expertise and work ethic are deeply missed, CAIR congratulates her on this new opportunity and extends its deepest gratitude for her many contributions.

Among her most significant achievements was her leadership with the 2024 Culturally Augmented Learning in Biomedical Informatics Research (CALIBIR) program, a summer research internship jointly offered by CAIR and the Wake Forest Department of Biomedical Engineering (BME). Under the administrative management of Brittany and BME Program Coordinator **Thea Smith**, the program flourished, giving students valuable experience in translational AI and biomedical informatics research.

During Latrice's maternity leave last summer, Brittany took on additional responsibilities by planning CAIR's 2024 Colloquium and serving as the center's primary liaison for visiting speakers and guests.

Brittany's impactful work will have a lasting effect at CAIR. As she begins a new chapter in her career, the center expresses its heartfelt appreciation for her and wishes her every success in her new endeavor.

Invitation to Contribute to AI Research Project Inventory

As part of Wake Forest CAIR's ongoing efforts to highlight and support the innovative and high-impact work being undertaken in our community, we are compiling an inventory of AI research projects at Advocate Health (including Aurora Healthcare, Advocate Healthcare, and Atrium Health) and Wake Forest University School of Medicine.

What Is an "AI Research Project"?

An AI research project encompasses any research initiative that involves developing or applying AI technologies.

This includes, but is not limited to, projects focusing on machine learning, deep learning, AI algorithms, computer vision, natural language processing, robotics, and AI applications in various disciplines. The aim is to understand, augment, or create systems that exhibit some form of human-like intelligence or autonomous decision-making.

To ensure that your project is included in this inventory and to foster collaboration and awareness within our community, we kindly ask you to complete this questionnaire. The questionnaire seeks to gather essential information about your project.

Please complete the questionnaire as soon as possible. Your contributions are invaluable, and we believe that this inventory will serve as a vital resource for fostering collaboration, securing funding, and showcasing our collective achievements in AI research.

CAIR Hiring for Multiple Faculty Positions

Wake Forest CAIR is seeking dynamic researchers who are passionate about advancing AI in healthcare for multiple faculty roles.

Assistant/Associate Professor in AI for Clinical Trials

CAIR is seeking an innovative faculty member to lead groundbreaking research at the intersection of AI and clinical trials. This role focuses on developing AI-driven methodologies to enhance clinical trial design, execution, and analysis – improving patient recruitment, trial efficiency, and outcome prediction.

Key Responsibilities:

- Develop and apply AI techniques to optimize clinical trials, including patient recruitment, data analysis, and outcome prediction
- Secure external research funding through grants and industry partnerships
- Publish in high-impact journals and present findings at leading conferences
- Mentor graduate students, postdoctoral fellows, and junior faculty
- Teach courses relevant to AI and healthcare research
- Collaborate with clinicians, AI researchers, and biostatisticians to translate research into real-world applications

Qualifications:

- PhD, MD, or equivalent in computer science, biomedical informatics, statistics, or a related AI-focused field
- Proven research excellence, demonstrated by publications and grant funding
- Expertise in AI techniques such as machine learning, deep learning, and natural language processing in healthcare
- Experience in clinical trial design and analysis or a strong interest in developing such expertise
- Ability to collaborate in multidisciplinary teams and engage with industry partners

Preferred Qualifications:

- Experience leading or participating in clinical trials
- Strong track record in securing external research funding
- Proficiency in AI and statistical programming

Interested applicants should submit a cover letter detailing research interests and experience, résumé/CV, statement of research interests and goals, and contact information for at least three professional references. Applications are reviewed on a rolling basis.

For more information or to apply, email cairjobs@wakehealth.edu.

Continued on next page

CAIR Hiring for Multiple Faculty Positions

(continued)

Tenure-Track Faculty Positions in AI

CAIR is also seeking tenure-track faculty members with expertise in AI. This role is ideal for candidates eager to develop novel AI methodologies or apply existing techniques in innovative ways. Faculty members will have the opportunity to collaborate with investigative teams and leverage AI to enhance research and healthcare delivery within Atrium Health.

Key Responsibilities:

- Establish an independent research program in AI
- Collaborate with multidisciplinary teams to integrate AI into healthcare applications
- Engage in AI research that spans multiple sub-disciplines
- Contribute to the growing AI research community at CAIR and Atrium Health

Qualifications:

- MD and/or PhD in a related discipline
- Strong research background in AI and its applications
- Experience in securing research funding
- Ability to work collaboratively across disciplines

Interested applicants should submit a cover letter detailing research interests and experience, résumé/CV, statement of research interests and goals, and contact information for at least three professional references. Applications are reviewed on a rolling basis.

For more information or to apply, email cairjobs@wakehealth.edu.

Applications Now Open for Wake Forest CTSI's Predoctoral Research Training Program

The Wake Forest Clinical and Translational Science Institute (CTSI) is seeking applications for its Academic Learning Health System Scholars Prevention for Promoting Health Equity (aLHS-Pre) program, an NIH T32-funded predoctoral training initiative designed to equip scholars with the skills needed to conduct research within health systems and translate their findings into real-world practice.

Janet Tooze, PhD

Alain Bertoni, MD

Led by **Janet Tooze, PhD**, T32 Co-Program Director, and **Alain Bertoni, MD**, Clinical and Translational Science Pilot Co-Leader, the program provides a one-year, full-time training opportunity. Participants will receive a stipend, dedicated research time, and full tuition support for graduate school training, an MS in Translational and Health System Science, with the guidance of a multidisciplinary mentoring team.

Eligibility and Application Process

Applicants must be U.S. citizens, noncitizen nationals, or permanent residents. Participants are required to commit 40 hours per week to the program's educational and research activities for the entire training period.

Interested applicants should submit the following materials:

- An updated resume
- A personal statement outlining career goals (maximum 500 words)
- A health equity statement (maximum 500 words)

Applications are due by Friday, March 14 and may be submitted here.

Inquiries about aLHS-Pre should be sent to Dr. Alain Bertoni at abertoni@wakehealth.edu or Dr. Janet Tooze at jtooze@wakehealth.edu or ctsieducation@wakehealth.edu. More information about the program is available here.

Recent Events

★ 2024 “Mental Health Rewired” Closing Event ★

Wake Forest CAIR recently partnered with the Wake Forest Center for Remote Health Monitoring to host the 2024 “Mental Health Rewired,” a build-a-thon designed to inspire students to create digital solutions for advancing mental health care.

Kicking off in late October, the event brought together undergraduate and graduate students from Wake Forest University and UNC-Greensboro, with participants forming four teams to work together for three weeks in competing for $1,200 in total prizes.

The culmination of their efforts was a special closing event held Tuesday, Nov. 19 at Wake Forest Biotech Place, with each team delivering a final presentation to medical doctors and researchers from Atrium Health Wake Forest Baptist. Congratulations to the winners:

Team CIALAB: First Place in Track 1: Data Science
Team Trifecta: First Place in Track 2: Digital Mental Health Product Invention

Special thanks to the 13 student participants for their innovative work and dedication throughout the event:

Team CIALAB: Usman Afzaal, Abdul Rehman Akbar, Usama Sajjad

Team Dream Chasers: Aarushi Agarwal, Susan Fesperman, Calvin Gardner, Gloria S.

Team Trifecta: Stephanie Gubish, Victoria Little, Melissa Medina

Team You’re Fine: Rishav Patel, Yeraldine Tamayo, Libby Zou

CAIR is grateful to all of the students, faculty, mentors, and everyone who contributed to making this inaugural event a resounding success. Planning for the 2025 event is under way and details will be announced in the coming months.

Participants and students gathered for a team photo at the build-a-thon’s closing event, held Nov. 19 at Wake Forest Biotech Place.

2024-25 *Artificial Intelligence in Action* Seminar Series

Friday, November 15

Presenter:
Ishanu Chattopadhyay, PhD
University of Kentucky

Seminar Title: "Third-Wave AI for Medicine: From Test-Free Screening of Complex Diseases to Digital Twins of Microbiomes and Pandemics"

Summary: Dr. Chattopadhyay highlighted AI-driven test-free screening for early disease detection and digital twins for modeling biology, improving diagnostics, and predicting illness.

WATCH

Monday, January 13

Presenter:
Jaime Lynn Speiser, PhD
Wake Forest University
School of Medicine

Title: "Benchmarking for Evaluation and Comparison of Analytic Methodology with Clustered Data"

Summary: Dr. Speiser introduced OpenClustered, an R package for benchmarking clustered data, and covered dataset challenges, methodologic needs, and a pilot study comparing statistical models.

WATCH

Wednesday, January 29

Presenter:
Christine Coughlin, JD
Wake Forest School of Law

Title: "Artificial Intelligence and Bioengineered Technologies in a Shifting U.S. Legal and Regulatory Landscape"

Summary: Discussing the transformative potential of AI and bioengineered technologies, Professor Coughlin examined how evolving legal frameworks have impacted innovation.

WATCH

Thursday, February 13

Presenter:
Rachel Levy, PhD
NC State University

Title: "Building Idea Exchange Between Data Scientists, Digital Humanists and Artists in an Age of AI"

Summary: Dr. Levy explored how AI is reshaping discovery in applied mathematics and the arts, highlighting interdisciplinary collaborations, generative AI's impact, and challenges in intellectual property.

WATCH

Upcoming Events

Tuesday, March 4
5:00 p.m. – 7:00 p.m.

WHAT: Celebrate Research! Opening Event: Keynote Address with Dr. William Kaelin

WHERE: Millennium Center (101 W. 5th St., Winston-Salem, NC)

REGISTER

Wednesday, March 5
2:00 p.m. – 4:00 p.m.

WHAT: Collaboration in Action: A Joint Pilot Program with the UNC-Charlotte AI4Health Center

WHERE: Wake Forest Biotech Place (575 Patterson Ave., Winston-Salem, NC)

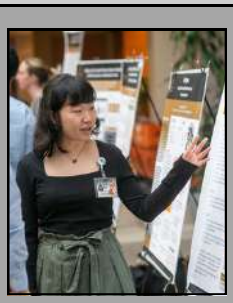
Friday, March 7
12:00 p.m. – 1:00 p.m.

WHAT: AI-IA Seminar: Andinet Enquobahrie, PhD

TITLE: "Translating Open-Source Innovation into Real-World Medical AI Solutions"

WHERE: Bailey Power Plant (486 Patterson Ave., Winston-Salem, NC)

Tuesday, March 18
9:00 a.m. – 4:00 p.m.



WHAT: 2025 CTSI Day: Featuring the Scholar Showcase

WHERE: Wake Forest Biotech Place (575 Patterson Ave., Winston-Salem, NC)

REGISTER

Wednesday, March 19
12:00 p.m. - 1:00 p.m.

WHAT: AI-IA Seminar: Gustavo Rohde, PhD; University of Virginia

TITLE: "Transport-Based Morphometry for Predictive Modeling of Biomedical Imaging Data"

WHERE: Webex

Thursday, April 3
12:00 p.m. - 1:00 p.m.

WHAT: AI-IA Seminar: Erdal Cosgun, PhD; Microsoft Genomics

TITLE: "Enhancing GPT Models for Genomic Analysis"

WHERE: Webex

Friday, May 16
12:00 p.m. - 1:00 p.m.

WHAT: AI-IA Seminar: Francois Modave, PhD; Wake Forest School of Medicine

Metin Gurcan, PhD

Director, Center for Artificial Intelligence Research
Senior Associate Dean, Artificial Intelligence
Professor, General Internal Medicine
Professor, Wake Forest Institute for Regenerative Medicine

Publications

Rezapour M, Narayanan A, Gurcan MN, "Machine Learning Analysis of RNA-Seq Data Identifies Key Gene Signatures and Pathways in Mpox Virus-Induced Gastrointestinal Complications Using Colon Organoid Models," International Journal of Molecular Sciences, Oct 17;25(20):11142, 2024.

Rezapour M, Walker SJ, Ornelles DA, Niazi MKK, McNutt PM, Atala A, Gurcan MN, "Exploring the host response in infected lung organoids using NanoString technology: A statistical analysis of gene expression data," PLOS ONE 19(11): e0308849. https://doi.org/10.1371/journal.pone.0308849, 2024

Capar A, Ekinci DA, Ertano M, Niazi MK, Balaban EB, Aloglu I, Dogan M, Su Z, Aker FV, Gurcan MN, "An interpretable framework for inter-observer agreement measurements in TILs scoring on histopathological breast images: A proof-of-principle study," PloS one, 2024 Dec 5;19(12):e0314450.

Talks

"Exploring the Ethical Landscape of Artificial Intelligence," with Andrew Kuzma PhD, AAH Nursing Grand Rounds, October 17, 2024.

PhD Student Graduation:

- **Ziyu Su,** "Theory and design of interpretable weakly supervised learning methods: application to breast cancer histopathology," November, 2024

Meredith Adams, MD, MS, FASA, FAMIA

Associate Professor, Anesthesiology
Associate Professor, Public Health Sciences

Publications

Adams, M. C. B., Griffin, C., Adams, H., Bryant, S., Hurley, R. W., & Topaloglu, U. (2024). Adapting the open-source Gen3 platform and kubernetes for the NIH HEAL IMPOWR and MIRHIQL clinical trial data commons: Customization, cloud transition, and optimization. Journal of biomedical informatics, 159, 104749. https://doi.org/10.1016/j.jbi.2024.104749

Adams, M. C. B., Akeju, O., Prakash, Y. S., & Orser, B. A. (2024). Charting the Future of the Global Anesthesia Research Community: The Vision of the International Anesthesia Research Society. Anesthesia and analgesia, 10.1213/ANE.0000000000007221. Advance online publication. https://doi.org/10.1213/ANE.0000000000007221

Bicket, M. C., Adams, M. C. B., & Fernandez, A. C. (2024). From Notes to Knowledge: Deciphering Perioperative Risky Substance Use through Natural Language Processing. Anesthesiology, 141(5), 829–831. https://doi.org/10.1097/ALN.0000000000005163

Adams, M. C. B., Hassett, A. L., Clauw, D. J., & Hurley, R. W. (2024). The NIH Pain Common Data Elements: A Great Start but a Long Way to the Finish Line. Pain medicine (Malden, Mass.), pnae110. Advance online publication. https://doi.org/10.1093/pm/pnae110

Adams, M. C. B., Griffin, C., Adams, H., Bryant, S., Hurley, R. W., & Topaloglu, U. (2024). Adapting the open-source Gen3 platform and kubernetes for the NIH HEAL IMPOWR and MIRHIQL clinical trial data commons: Customization, cloud transition, and optimization. Journal of biomedical informatics, 159, 104749. https://doi.org/10.1016/j.jbi.2024.104749

Presentations

Presented, **Adapting Gen3 And Kubernetes For The NIH HEAL IMPOWR And MIRHIQL Clinical Trial Data Commons**, at IMPOWR Executive Committee in Pittsburgh, PN on 11/19/2024.

Presented, **Data-Driven Solutions: AI and Informatics in Pain and Addiction Management**, at Harvard Grand Round in Cambridge, MA on 12/18/2024

Ajay Dharod, MD, FACP

Associate Professor, General Internal Medicine
Associate Professor, Implementation Science

Publications

Manuscript published to JGIM. Bundy H, Gerhart J, Baek S, Connor CD, Isreal M, **Dharod A**, Stephens C, Liu TL, Hetherington T, Cleveland JA. "Can the Administrative Loads of Physicians be Alleviated by AI-Facilitated Clinical Documentation?" Journal of General Internal Medicine. 2024 Jun 27. doi: 10.1007/s11606-024-08870-z. Online ahead of print. PubMed PMID: 38937369

Manuscript published to JAMA Network Open. Liu TL, Hetherington TC, Stephens C, McWilliams A, **Dharod A**, Carroll T, Cleveland JA. "AI-powered clinical documentation and clinicians' Electronic Health records' experience: A Nonrandomized Controlled Trial". Published to JAMA Network Open . 2024; 7(9):e2432460. doi: 10.1001/jamanetworkopen.2024.32460. PubMed PMID: 39240568

Manuscript published to NEJM AI. Tsai-Ling Liu, Timothy C. Hetherington, **Ajay Dharod**, Tracey Carroll, Richa Bundy, Hieu Nguyen, Henry Bundy, McKenzie Isreal, Andrew McWilliams, and Jeffrey Cleveland. "Does AI-Powered Clinical Documentation Enhance Clinician Efficiency? A Longitudinal Study". Published November 22, 2024.

Accomplishments

Honors/Awards

Elected as a Fellow to the AMIA. Will be inducted at the 2025 AMIA Clinical Informatics Conference that will be held from May 20-22, 2025.

Clinical Initiatives

Maureen Kelley (PI, Equity and Difference Study) co-developed and launched a new substudy sponsored by Welcome Trust on "Understanding and Mitigating Bias in Clinical Applications of Artificial Intelligence" in partnership with Bradley Rowland (Bioinformatics), Ajay Dharod (Bioinformatics), Metin Gurcan (CAIR), Arezoo Movaghar (Pediatrics).

Brian Wells, MD, PhD

Assistant Professor, Biostatistics and Data Science

Publications

Casacchia NJ, Lenoir KM, Rigdon J, Wells BJ. Development, validation and recalibration of a prediction model for prediabetes: an EHR and NHANES-based study. BMC Med Inform Decis Mak 2024;24:387. https://doi.org/10.1186/s12911-024-02803-w.

Weaver KE, Dressler EV, Klepin HD, Lee SC, Wells BJ, Smith S, Hundley WG, Lesser GJ, Nightingale CL, Turner JC, Lackey I, Heard K, Foraker R, null null, Weaver KE, Foraker R, Dressler EV, Wells B, Hundley WG, Klepin H, Payne P, Lai A, Lee SC, Lesser GJ, Carlson JW, Hernandez ML, Hanna J, Rodgers HA, Varghese SJ, Throckmorton AD, Panikkar R, Ronjon P, Lukenbill J, Stroh AL, Onitilo AA, Kulbacki LW, Matin K, Hackney MH. Effectiveness of a Cardiovascular Health Electronic Health Record Application for Cancer Survivors in Community Oncology Practice: Results From WF-1804CD. JCO 2025;43:46–56. https://doi.org/10.1200/JCO.24.00342.

Grants

Title: Identifying Clinically Relevant PIF Cutoffs
Major goals: Using Electronic Health Record data, examine the association between Peak Inspiratory Flow rates with mortality and other clinical endpoints.
Name of PD/PI: Wells, BJ
Source of Support: Mylan Pharmaceuticals
Project/Proposal Start and End Date: (MM/YYYY) (if available): 08/2024 – 07/2025
Total Award Amount (Including Indirect Costs): $140,000

Title: Validation of a Model for Predicting Pulmonary Obstruction
Major goals: Recruit adults without a history of COPD for pulmonary function testing. Validate existing EHR-based model for predicting obstruction and compare with other tools.
Name of PD/PI: Wells, BJ
Source of Support: Chiesi Pharmaceuticals.
Project/Proposal Start and End Date: (MM/YYYY) (if available): 01/2025 – 12/2025
Total Award Amount (Including Indirect Costs): $140,000

Da Ma, PhD

Assistant Professor, Gerontology and Geriatric Medicine

Publications

Journal Publications

H Shi, S Jiang, D Ma, MF Beg, J Cao. Supervised functional principal component analysis under the mixture cure rate model: an application to Alzheimer's disease Statistics in Medicine (Accepted)

Ma D, Zhang H, Wang L. Editorial: Deep Learning Methods and Applications in Brain Imaging for the Diagnosis of Neurological and Psychiatric Disorders. Frontiers in Neuroscience. 2024/10.

Krishnamurthy S, Lu L, Johnson CJ, Baker LD, Leng X, Gaussoin SA, Hughes TM, Ma D, Caban-Holt A, Byrd GS, Craft S. Impact of neighborhood disadvantage on cardiometabolic health and cognition in a community-dwelling cohort. Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring. 2024 Oct(4):e70021.

Dietz MV, Popuri K, Janssen L, Salehin M, Ma D, Chow VT, Lee H, Verhoef C, Madsen EV, Beg MF, van Vugt JL. Evaluation of a fully automated computed tomography image segmentation method for fast and accurate body composition measurements. Nutrition. 2025 Jan 1;129:112592.

Rahmani F, Camps G, Mironchuk O, Atagu N, Ballard DH, Benzinger TL, Chow VT, Dahiya S, Evans J, Jaswal S, Hosseinzadeh Kassani S., Ma D, etc. Abdominal myosteatosis measured with computed tomography predicts poor outcomes in patients with glioblastoma. Neuro-Oncology Advances. 2025 Jan;7(1):vdae209.

Mironchuk O, Chang AL, Rahmani F, Portell K, Nunez E, Nigogosyan Z, Ma D, Popuri K, Chow VT, Beg MF, Luo J. Volumetric body composition analysis of the Cancer Genome Atlas reveals novel body composition traits and molecular markers Associated with Renal Carcinoma outcomes. Scientific reports. 2024 Nov 6;14(1):27022.

Talks

2024.11: Invited Speaker: Wake Forest CRBM-MIG seminar - Impact of Cardiometabolic Risk Factors on Neuroimaging-Derived Brain Aging and Dementia Risks

2024.10: Invited Speaker: Alzheimer's Association ISTAART Neuroimaging PIA: Brain Imaging Genetics Work Group - Multi-modal Neuroimaging and Polygenic based Dementia Risk & Prediction for Alzheimer's Disease

2024.10: Invited Speaker: Neuroconnect Workshop 2024: Multi-modal Neuroimaging & Genomics for Alzheimer's Disease & Dementia Risk Prediction

Ibrahim Karabayir, PhD

Assistant Professor, Internal Medicine, Cardiovascular Medicine

Publications

Karabayir, I., Gilbert, O., Valika, A., Celik, T., Krishnan, A., Chintala, L., ... & Akbilgic, O.Electrocardiogram-Based AI for Classifying Left Ventricular Dysfunction and Heart Failure with Preserved Ejection Fraction. Available at SSRN 5024367.

Butler, L., Ivanov, A., Celik, T., Karabayir, I., Chinthala, L., Tootooni, M. S., ... & Akbilgic, O. (2024). Time-Dependent ECG-AI Prediction of Fatal Coronary Heart Disease: A Retrospective Study. Journal of Cardiovascular Development and Disease, 11(12), 395.

Accomplishments

Grants

ECG-AI for Predicting Short-Term Mortality and Myocardial Infarction in ED Chest Pain Presentations, Center for Artificial Intelligence Research (CAIR) & Critical Illness Injury and Recovery Research Center (CIIRRC) Joint Pilot Award, Funded, 2025. PI.

Remote Assessment of Brain Natriuretic Peptides to Improve Heart Failure Management, The Center for Remote Health Monitoring Pilot Program, Funded, 2025, co-PI.

A Mobile App for Noninvasive BNP Estimation, NIH STTR Submission, Academic PI, December 2024. Resubmitted.

Talks

Symposium Panelist, The Legal Implications of Artificial Intelligence and Healthcare. Organized by the Wake Forest Center for Artificial Intelligence Research (CAIR) and the Wake Forest School of Law. October 25, 2024.

An ECG-based Heart Failure Screening Tool for People with Sickle Cell Disease, Podium Presentation, AHA 24, Chicago, IL.

FACULTY PUBLICATIONS & ACHIEVEMENTS

Eric Kirkendall, MD, MBI

Professor, Pediatrics - Hospitalists

Publications

Kandaswamy, S., Knake, L. A., Dziorny, A., Hernandez, S., McCoy, A. B., Hess, L. M., Orenstein, E., White, M. S., Kirkendall, E. S., Molloy, M., Hagedorn, P., Muthu, N., Murugan, A., Beus, J. M., Mai, M., Luo, B., & Chaparro, J. D. (2025). Pediatric Predictive Artificial Intelligence Implemented in Clinical Practice from 2010–2021: A Systematic Review. Applied Clinical Informatics. Advance online publication. https://doi.org/10.1055/a-2521-1508

FACULTY PUBLICATIONS & ACHIEVEMENTS

Mohammad J. Moghimi, PhD

Assistant Professor, Biomedical Engineering

Publications

Vaibhav B. Yadav, Enosh Lim, Alison H. Skalet, Mohammad J. Moghimi “Evaluation of electrical impedance spectroscopy of bovine eyes for early detection of uveal melanoma” npj Biosensing 1 (Nature Portfolio), 19 (2024).

Accomplishments

Presented the poster on "Smart contact lens for early identification of intraocular tumors" in Arpa-H OCULAB event, St. Petersburg, Florida, December 12, 2024.

FACULTY PUBLICATIONS & ACHIEVEMENTS

Mostafa Rezapour, PhD

Assistant Professor, Wake Forest Institute for Regenerative Medicine

Publications

Rezapour, Mostafa, Aarthi Narayanan, and Metin Nafi Gurcan. "Machine Learning Analysis of RNA-Seq Data Identifies Key Gene Signatures and Pathways in Mpox Virus-Induced Gastrointestinal Complications Using Colon Organoid Models." International Journal of Molecular Sciences 25, no. 20 (2024): 11142.

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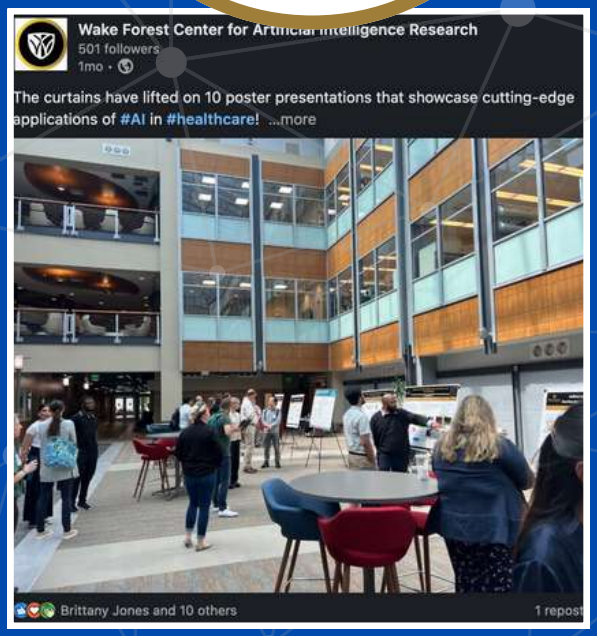

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