Brain Health and Rehabilitation through Artificial Intelligence Network Summit

September 7 - 9
Hilton Crystal City at Reagan National Airport
The BRAIN Summit will highlight how AI impacts three areas of critical importance to Veterans’ health:

- **BRAIN CANCER**
- **BRAIN INJURY AND REHABILITATION**
- **MENTAL HEALTH**

The BRAIN Summit will showcase cutting-edge AI interventions and advancements made by the NAll and its strategic partners. Summit speakers will present on a wide range of AI subjects, provoking conversation and fostering learning, inspiration and collaboration.

**Join** clinicians, researchers and other AI experts from government, industry, academia and the nonprofit sector for three days of premier presentations, panel discussions and networking opportunities.
WHY SHOULD I ATTEND?

The BRAIN Summit will be NAll's first comprehensive conference and networking event on AI and healthcare. Join us to:

- Hear about AI advances in mental health from leaders in government, academia and the healthcare industry
- Connect with experts in AI, mental health, traumatic brain injury and brain cancer
- Learn about opportunities to share the latest research and best practices
- Get recommendations on how to integrate AI into Veterans' health care
- Hear from the NAll AI Tech Sprint winners of 2021

WHAT TOPICS WILL BE COVERED?

- Early tumor detection in head and neck cancers
- Brain tumor classification and personalization of targeted treatment
- Sensory and motor skills rehabilitation
- Post traumatic stress disorder (PTSD) and its association with overall brain health
- Screening for depression and suicide prevention
- Management of traumatic brain injury (TBI)
- More!

HOW CAN I NETWORK WITH OTHER ATTENDEES?

- Engaging panel discussions
- BRAIN Summit Exhibit Hall
- BRAIN Summit online platform
FEATURED SPEAKERS

Dr. Carolyn Clancy
Assistant Under Secretary for Health for Discovery, Education and Affiliate Networks
Veterans Health Administration

Gil Alterovitz, Ph.D.
National Artificial Intelligence Institute
Office of Research and Development
Veterans Health Administration

Dr. Siddhartha Mukherjee
Assistant Professor
Columbia University Medical Center and
Author of the Pulitzer-prize winning book The Emperor of All Maladies: A Biography of Cancer

Dr. Alfredo Quinones-Hinojosa
William J. and Charles H. Mayo Professor and
Monica Flynn Jacoby Endowed Chair of Neurosurgery
Mayo Clinic
REGISTRATION

All BRAIN Summit events and sessions will be held at the Hilton Crystal City. Register for the BRAIN Summit.

HOTEL

Rooms for BRAIN Summit participants are available at the Hilton Crystal City. To receive the conference rate for your hotel room, please reserve your room here or call 1-800-445-8667 (1-800-HILTONS) and reference the group code SBH.

LOCATION

Hilton Crystal City at Reagan National Airport
2399 Richmond Highway Arlington, VA 22202
1-800-445-8667 (1-800-HILTONS)

Located at National Landing, less than five minutes from Ronald Reagan National Airport and Washington, DC, the hotel offers a free shuttle from Ronald Reagan National Airport. Visitors can also take the Metro blue line to Crystal City.

DINING

Several restaurants are within walking distance of the hotel.

NEED MORE INFORMATION?

Visit the BRAIN Summit webpage. For questions about exhibiting or attendance, please email VACObrainsummit@va.gov.
AGENDA – DAY 1 (Morning)

Wednesday, September 7, 2022

7:00 – 9:00  Breakfast, Registration, Exhibitor Hall Opens
9:00 – 9:50  Welcome & Opening Remarks – Dr. Rafael Fricks, Dr. Gil Alterovitz & Dr. Carolyn Clancy
9:50 – 10:00 Break
10:00 – 11:20 Morning Breakout Sessions
    Breakout Session 1: AI in Mental Health
    Breakout Session 2: Discovery Through Data
    Breakout Session 3: AI in Traumatic Brain Injury
    Tool Tutorial Session: Databricks
11:20 – 11:30 Break
11:30 – 12:30 Luncheon Keynote – Dr. Ronald Summers
12:30 – 1:00 Afternoon Keynote – Dr. Siddhartha Mukherjee
1:00 – 1:10 Break
AGENDA – DAY 1 (Afternoon)

Wednesday, September 7, 2022

1:10 – 2:30  **Mid-Day Breakout Sessions**
- **Breakout Session 1**: AI in Traumatic Brain Injury
- **Breakout Session 2**: AI in Cancer - Radiomics
- **Tool Tutorial Session**: GDIT

2:30 – 2:40  Break

2:40 – 4:00  **Afternoon Breakout Sessions**
- **Breakout Session 1**: AI in Technology
- **Breakout Session 2**: Data Privacy
- **Breakout Session 3**: Suicide Prevention
- **Tool Tutorial Session**: Siemens Healthineers & Red Hat

4:00 – 4:10  Break (Exhibitor Hall Closes)

4:10 – 5:00  **Afternoon Plenary Session** – Dr. Alfredo Quiñones-Hinojosa & Dr. Jordan Green
AGENDA – DAY 2 (Morning)

Thursday, September 8, 2022

7:00 – 9:00  Attendee Health Checks & Exhibitor Hall Opens

9:00 – 9:50  Welcome & Opening Keynote – Dr. Nick van Terheyden

9:50 – 10:00  Break

10:00 – 11:20  Morning Breakout Sessions
   Breakout Session 1: AI in Mental Health
   Breakout Session 2: AI in Cancer
   Breakout Session 3: AI in VA Innovations
   Tool Tutorial Session: Apex Data Solutions

11:20 – 11:30  Break

11:30 – 12:30  Luncheon Keynote – Dr. Eliot Siegel

12:30 – 1:00  Afternoon Keynote – Dr. Jackie Ward (OSTP) & Dr. Theresa Cruz (NIH)
AGENDA – DAY 2 (Afternoon)

Thursday, September 8, 2022

1:00 – 1:10  Break

1:10 – 2:30  Mid-Day Breakout Sessions
  Breakout Session 1: TBI/Stroke
  Breakout Session 2: AI in The Cancer Imaging Archive (TCIA)
  Breakout Session 3: Panel: AI Tech Sprints
  Tool Tutorial Session: Oracle & Palantir

2:30 – 2:40  Break

2:40 – 4:00  Afternoon Breakout Sessions
  Breakout Session 1: Blockchain in Healthcare
  Breakout Session 2: AI in Mental Health
  Breakout Session 3: AI in VA Infrastructure
  Tool Tutorial Session: NVIDIA
AGENDA – DAY 3

Friday, September 9, 2022

7:00 – 9:00  Attendee Health Checks & Exhibitor Hall Opens
9:00 – 9:50  Welcome & Opening Keynote – Dr. Michael Abramoff
9:50 – 10:00 Break
10:00 – 11:20  Morning Breakout Sessions
  Breakout Session 1: Regulation
  Breakout Session 2: Emerging Applications
  Breakout Session 3: AI in Cancer - NeuroPOP
  Tool Tutorial Session: IBM
11:20 – 11:30  Break & Exhibitor Hall Closes
11:30 – 12:30  Closing Remarks – Dr. Rafael Fricks & Dr. Gil Alterovitz
Carolyn Clancy, MD, MCAP

Assistant Under Secretary for Health Discovery, Education & Affiliate Networks, Veterans Health Administration

Dr. Clancy serves as the Assistant Under Secretary for Health (AUSH) for Discovery, Education & Affiliate Networks (DEAN), Veterans Health Administration (VHA), effective July 22, 2018. The Office of the DEAN fosters collaboration and knowledge transfer with facility-based educators, researchers, and clinicians within VA, and between VA and its affiliates.

Prior to her current position, she served as the Acting Deputy Secretary of the Department of Veterans Affairs, the second-largest Cabinet department, with a $246 billion budget and over 424,000 employees serving in VA medical centers, clinics, benefits offices, and national cemeteries, overseeing the development and implementation of enterprise-wide policies, programs, activities, and special interests. She also served as the VHA Executive in Charge, with the authority to perform the functions and duties of the Under Secretary for Health, directing a health care system with a $68 billion annual budget, overseeing the delivery of care to more than 9 million enrolled Veterans. Previously, she served as the Interim Under Secretary for Health from 2014-2015. Dr. Clancy also served as the VHA AUSH for Organizational Excellence, overseeing VHA’s performance, quality, safety, risk management, systems engineering, auditing, oversight, ethics, and accreditation programs, as well as ten years as the Director, Agency for Healthcare Research and Quality.

She is a highly experienced and nationally recognized physician executive. Dr. Clancy is a general internist and health services researcher, a graduate of Boston College and the University of Massachusetts Medical School. She holds an academic appointment at George Washington University’s School of Medicine and serves as Senior Associate Editor, Health Services Research Journal. She has contributed to eight academic textbooks and authored, co-authored, and provided invited commentary in more than 225 scholarly journal articles. She served as member of the National Quality Forum’s Board of Directors, Chair of the AQA Alliance and served on the Board of Governors for the Patient-Centered Outcomes Research Institute. She is an elected member of the National Academy of Medicine and was presented with the 2014 Quality Champion Award from the National Committee for Quality Assurance. She was also named as an Honorary Fellow of the American Academy of Nursing and was selected as the 2015 Outstanding Federal Executive of the Year by Disabled American Veterans. In 2018, she was selected as one of the Top 50 Physician Executives by Modern Healthcare, and in 2019, she was identified as one of the 50 Most Influential Clinical Executives by Modern Healthcare.
Dr. Gil Alterovitz is the inaugural Director of the National Artificial Intelligence Institute (NAII). He has a PhD in electrical and biomedical engineering from MIT. Throughout his career at the U.S. Department of Veterans Affairs (VA), Dr. Alterovitz has led national and international collaborative initiatives for developing novel informatics methods and approaches for integrating clinical, pharmaceutical, and genomic information, from research to point-of-care. As the NAII director, Dr. Alterovitz focuses on helping VA develop AI R&D capacity to help Veterans. Dr. Alterovitz is also on the faculty at Harvard Medical School. He has produced over 50 peer-reviewed publications and three books in his research field. Dr. Alterovitz is one of the leading authors of VA’s AI Strategy. He is also one of the core authors of The National AI R&D Strategic Plan produced by the White House Office of Science Technology.
Siddhartha Mukherjee, MD

Assistant Professor of Medicine, Columbia University / Cancer Physician & Researcher / Author

Dr. Siddhartha Mukherjee is the author of The Emperor of All Maladies: A Biography of Cancer, winner of the 2011 Pulitzer Prize in general nonfiction, and The Laws of Medicine. He is the editor of Best Science Writing 2013. Siddhartha Mukherjee’s THE GENE: An Intimate History is his latest work – the story of the quest to decipher the master-code of instructions that makes and defines humans, that governs our form, function, and fate and determines the future of our children.

Dr. Alfredo Quiñones-Hinojosa, also known as "Dr. Q", serves as Chairman of the Department of Neurological Surgery and leads the Brain Tumor Stem Cell Laboratory at Mayo Clinic Florida, where he has been recognized with the distinction of the William J. and Charles H. Mayo Endowed Professorship.

Dr. Quiñones-Hinojosa earned his B.A. in psychology from the University of California–Berkeley and his M.D. from Harvard Medical School, where he graduated cum laude. He completed his neurosurgery residency and a postdoctoral fellowship in developmental and stem cell biology at the University of California, San Francisco. His career as a neurosurgeon started at Johns Hopkins University in Baltimore, where he was promptly named as Professor of Neurosurgery and Oncology and served as the director of the Brain Tumor Program.

Dr. Quiñones-Hinojosa’s practice focuses on the treatment of primary and metastatic brain tumors. He is a world-renowned leader in brain mapping techniques utilized to safely remove tumors close to eloquent brain regions and in minimally invasive endoscopic approaches required to operate on difficult-to-reach skull base tumors. Dr. Q uses his laboratory as an extension of the operating room, and together with his team of scientists, they look to better understand and elucidate multiple molecular drivers of brain cancer migration, invasion, metabolism, and determinants of the tumor microenvironment. He also performs translational and clinical research. For instance, Dr. Quiñones-Hinojosa team has one active clinical human protocol to maximize the extent of resection in the operating room and several approved protocols to conduct our work in rodents, primates, and humans. One of the other current clinical projects involves using mesenchymal stem cells for the treatment of glioblastoma.

Dr. Quiñones-Hinojosa has written seven books about brain cancer and neurosurgery that have been translated to multiple languages. He has published over 550 peer-reviewed publications and currently holds an H-index of 81. His research is supported by the National Institute of Health (NIH), where he also serves as reviewer in many NIH study sections and recently selected as the chair of the Clinical Neuroimmunology and Brain Tumors (CNBT).

Over the last 15 years, Dr. Quiñones-Hinojosa has mentored more than 300 post-graduate students and neurosurgery residents, who are currently working in prestigious institutions of the United States such as Harvard, Johns Hopkins, MD Anderson, UCSF, as well as other institutions around the world in Mexico, Spain, Panama, England, and many others.

Dr. Quiñones-Hinojosa has received many honors and awards in recognition of his work. He has been named one of the 100 most influential Hispanics in 2008, as the recipient of the Gary Lichtenstein Humanitarian Award and Neurosurgeon of the Year in 2014, and one of Mexico’s most brilliant minds in
the world by Forbes Magazine in 2015. Dr. Quiñones-Hinojosa is the recipient of the prestigious Charles B. Wilson Award granted by the Congress of Neurological Surgeons (CNS) in 2021 due to his meritorious career in neurosurgery, and also serves as the current International Vice-chair of the AANS/CNS Tumor Section. Dr. Quiñones-Hinojosa has also received multiple honoris causa degrees from several institutions around the globe, including Southern Vermont College, Lackawanna College, Dominican University, University of Notre Dame, Loyola University, and other countries like Mexico, Ecuador, and Peru. Apart from his clinical and research activities. He is the co-founder and president of the non-profit organization Mission: BRAIN (Bridging Resources and Advancing International Neurosurgery; www.missionbrain.org) and a member of the executive committee of Voices Against Brain Cancer. He has also founded three companies to extend the reach of his discoveries to more patients and has filed more than 25 patents with the same purpose.

Dr. Quiñones-Hinojosa has published his inspirational autobiography, "Becoming Dr. Q," which verses on his journey from a migrant farmworker to a neurosurgeon. Part of Dr. Quiñones-Hinojosa life was included in the 2009 Peabody Award-winning ABC TV Series "Hopkins" and the 2021 EMMY/ BAFTA Award-winning show "The Surgeons Cut", produced by the BBC/Netflix. Disney and Plan B Entertainment productions announced that his inspirational life story will also be featured in theaters. For more information please visit a) www.doctorqmd.com b) https://www.mayoclinic.org/biographies/quinones-hinojosa-alfredo-m-d/bio-20238939
Dr. Jordan J. Green is a Professor of Biomedical Engineering, Ophthalmology, Neurosurgery, Oncology, Materials Science & Engineering, and Chemical & Biomolecular Engineering at the Johns Hopkins University School of Medicine. He is the Vice Chair for Research and Translation in Biomedical Engineering and is the former Director of the Biomedical Engineering Undergraduate Program at JHU. Dr. Green is also the founding Associate Director of the Translational Tissue Engineering Center and the founding Associate Director of Translational Immunomodulation Engineering Center at JHU. Dr. Green received his B.S. in Chemical Engineering and in Biomedical Engineering from Carnegie Mellon University in 2003 and completed his Ph.D. in Biological Engineering from MIT. Subsequently, Dr. Green was a postdoctoral associate at MIT from 2007-2008. Dr. Green was the founding CEO of the biotech company AsclepiX Therapeutics and currently serves as a member of the Board of Directors. He also co-founded and/or serves on the board of four other biotechnology companies. He is a Fellow of the National Academy of Inventors, the Biomedical Engineering Society, the American Institute for Medical and Biological Engineering, and the Controlled Release Society. He is also an Associate Editor at Science Advances and a standing member of the NIH NANO study section. His work has resulted in the publication of over 150 scientific papers, 86 issued or pending patents, and 120 invited talks, and he has received numerous awards including the AIChE Colburn Award, the BMES Rita Schaffer Award, the Presidential Early Career Award for Scientists and Engineers, Popular Science’s Brilliant Ten, and was a National Academy of Medicine Emerging Leader Scholar in Health & Medicine. Dr. Green and his lab are innovating gene therapies, immunotherapies, and cell therapies to advance medicine.
Dr. Nick is a physician leader and business strategist who draws on his clinical experience, technological prowess, and relationship management capabilities to craft and implement transformative, patient-centered strategies aimed at improving operational performance and efficiency. He is an industry thought leader and a prominent healthcare IT influencer, having been featured in the top 5 of the #DigitalHealth Power 100 list of leading healthcare tech and AI influencers to follow. As such, Nick brings unparalleled expertise on the critical role digital innovation plays in improving patient outcomes and ensuring the long-term success and financial sustainability of organizations in the ever-evolving healthcare landscape. Having served as an executive leader at organizations such as Dell, Nuance, and Philips and led the implementation of digital transformation strategies for multiple national and international healthcare clients, Nick has grown to become one of the industry’s most trusted advisers on executing groundbreaking technology solutions to drive remedial change.
Eliot Siegel, MD

Professor and Vice Chair, University of Maryland School of Medicine, Department of Diagnostic Radiology

Dr. Eliot Siegel is Professor and Vice Chair at the University of Maryland School of Medicine, Department of Diagnostic Radiology, as well as Chief of Radiology and Nuclear Medicine for the Veterans Affairs Maryland Healthcare System. He is the director of the Maryland Imaging Research Technologies Laboratory and has adjunct appointments as Professor of Bioengineering at the University of Maryland College Park and as Professor of Computer Science at the University of Maryland Baltimore County. Dr. Siegel was responsible for the NCI's National Cancer Image Archive and served as Workspace Lead of the National Cancer Institute's caBIG In Vivo Imaging Workspace. He has been named as Radiology Researcher and Radiology Educator of the year by his peers as well as one of the Top Ten radiologists. Under his leadership, the VA Maryland Healthcare System became the first filmless healthcare enterprise in the world. He has written over 200 articles and book chapters about PACS (Picture Archiving and Communication Systems) and digital imaging, and has edited six books on the topic, including Filmless Radiology and Security Issues in the Digital Medical Enterprise. He has made more than 1,000 presentations throughout the world on a broad range of topics involving computer applications in imaging and medicine. Dr. Siegel served as symposium chairman for the Society of Photo-optical and Industrial Engineers (SPIE) Medical Imaging Meeting for three years and is currently serving on the board of directors of the Society of Computer Applications in Radiology. He is a fellow of the American College of Radiology and of the Society of Imaging Informatics in Medicine.
Theresa Hayes Cruz, Ph.D., a biomedical engineer, is the Director of the National Center for Medical Rehabilitation Research (NCMRR) at the Eunice Kennedy Shriver National Institute of Child Health and Human Development. Through basic, translational, and clinical research, NCMRR fosters the development of scientific knowledge needed to enhance the health, productivity, independence, and quality-of-life of people with physical disabilities. As Director of NCMRR, Dr. Cruz led the development of the 2021 NIH Research Plan on Rehabilitation and planned the 2020 trans-NIH Rehabilitation Research Conference Envisioning a Functional Future. She represents NIH on various federal committees, including the Interagency Committee on Disability Research. In addition to her duties at NCMRR, Dr. Cruz is a Team lead in the NIH Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative where she co-manages a grant portfolio in the areas of neurotechnology development, validation, and translation.

Dr. Cruz joined NIH in 2009 as a program analyst. In 2015, Dr. Cruz performed a research detail at the Functional and Applied Biomechanics Laboratory in the Rehabilitation Medicine Department of the NIH Clinical Center. In late 2016, she returned fulltime to NCMRR in the role of program officer where she began an early career researcher program in rehabilitation. In 2020, Dr. Cruz was named the Director of NCMRR.

Dr. Cruz received her bachelor's degree in biomedical engineering with highest honors from the School of Engineering at Rutgers, the State University of New Jersey. She received her master's and doctoral degrees in biomedical engineering from Northwestern University. Her previous research at the Rehabilitation Institute of Chicago focused on motor control and gait impairments of the lower limb following stroke.
Ronald Summers, MD, PhD

Senior Investigator, National Institutes of Health (NIH) Clinical Center

Ronald M. Summers, M.D., Ph.D. is a tenured Senior Investigator and Staff Radiologist in the Radiology and Imaging Sciences Department at the NIH Clinical Center in Bethesda, MD. He is a Fellow of the Society of Abdominal Radiologists and of the American Institute for Medical and Biological Engineering. His awards include the Presidential Early Career Award for Scientists and Engineers, the NIH Director’s Award, the NIH Ruth L. Kirschstein Mentoring Award, and the NIH Clinical Center Director’s Award. He is a member of the editorial boards of the Journal of Medical Imaging, Radiology: Artificial Intelligence and Academic Radiology and a past member of the editorial board of Radiology. He was Co-Chair of the 2018 and 2019 SPIE Medical Imaging conferences and Program Co-Chair of the 2018 IEEE ISBI symposium. He has co-authored over 500 journal, review and conference proceedings articles and is a co-inventor on 17 patents. His research interests include thoracic and abdominal imaging, large radiology image databases, and artificial intelligence.
The National Artificial Intelligence Institute (NAII) seeks to advance Artificial Intelligence (AI) research, development, and training and share this knowledge globally, ensuring Veteran health and well-being.

The NAII develops the Department of Veterans Affairs’ (VA) AI R&D capabilities by:

- Designing and collaborating on national R&D initiatives and AI policy.
- Building partnerships across federal agencies, industry, and academia.
- Working across government to advance AI, including collaborating with 20+ VA offices on the VA AI Strategy and co-authoring the White House-released National AI R&D Strategic Plan.

As the largest integrated health care system in the country, VA is uniquely positioned to advance AI. VA has several big data repositories that can be used for R&D, including the largest genomic knowledge base linked to health care information in the world. Since the majority of U.S. doctors receive at least some part of their medical training at VA, VA has a myriad of opportunities to train medical professionals on the frontiers of AI technology.

The NAII is a joint initiative of the VA Office of Research and Development (ORD) and the Office of the Secretary’s Center for Strategic Partnerships (SCPS) in VA. Since its launch in 2019, the NAII continues to expand AI efforts by placing staff experienced in AI across VA medical centers and offices nationally. The promising outcomes of the NAII’s research collaborations over the past two years demonstrate that there is great potential to leverage AI to improve Veteran care.
Flagship R&D Pilot Projects leverage cutting-edge AI to solve some of the most pressing challenges facing VA. For example, the COVID-19 Explainable AI Tool used data from VA Medical Centers to develop an AI tool to predict COVID-19 mortality. Clinicians now use this platform to help inform COVID-19 treatment strategies. The NAII is studying how this tool affects patient outcomes and clinicians’ user experience. The NAII is also working to adapt the platform to make predictions about other diseases.

The NAII's AI Tech Sprints are competitions sponsored through VA and Challenge.gov to foster collaboration with industry and academia. Applicants design AI-enabled tools using federal data to address a specific Veteran need. The three top winners of the 2021 Tech Sprint were:

- **Behavidence** won the first place and $50,000 prize for developing a smartphone application that monitors Veteran activity, categorizes users by similar behavior, and flags for follow-up those at increased risk for suicide.

- **SoKat Consulting, LLC** scored second and received a $25,000 prize for creating a chatbot that can integrate with VA’s Blue Button medical records access. The chatbot answers Veteran questions and helps Veterans better understand their health care between visits.

- **General Dynamics IT** placed third and received $10,000 for an algorithm that classifies skin lesions and helps medical staff determine if an image is high enough quality for use in making a skin cancer diagnosis.

Strategic Partnerships with researchers and AI specialists across and outside of VA help the NAII pioneer new AI R&D and applications, drive operational improvements, and advance scientific scholarship to provide the best possible outcomes for Veterans. Current strategic partnerships center on physical health and well-being, the federal workforce, AI ethics, and public policy.

The NAII is well-positioned to enable AI Education, by sharing knowledge, techniques, and lessons learned with the larger VA community. The NAII is helping VA build AI R&D capacity from basic to clinical research and the NAII aims to train a new generation of AI scientists, practitioners, and clinicians to promote Veteran health and well-being. For example, the AI Tech Sprint Handbook provides information to support other teams and organizations in developing a sprint to introduce their ideas and solutions.
The AI@VA Community
AI@VA is a community of dedicated, passionate and curious minds – within and outside VA – focused on AI challenges facing Veteran health and well-being. By joining the AI@VA community, you will receive a periodic newsletter highlighting impactful AI work across VA, updates on the NAII, invitations to upcoming AI webinars, and related information.

Dr. Gil Alterovitz, Director, NAII
Dr. Gil Alterovitz is dedicated to building AI R&D capacity to help Veterans. He has led national and international collaborative initiatives for developing novel informatic methods and approaches for integrating clinical, pharmaceutical, and genomic information, from research to point-of-care. Dr. Alterovitz has written more than 50 peer-reviewed publications and three books in the field. He was one of the co-authors of the White House-released National AI R&D Strategic Plan and has served as a subject matter expert on AI legislation. Dr. Alterovitz has received wide recognition, including from Government Innovation Awards and FederalHealthIT 100, and Fed100 for his innovative work.

General Inquiries
For general inquiries and collaboration opportunities, contact NAII@va.gov.

Media Contact
For more information about the NAII, contact Sarah Kallassy, sarah.kallassy@va.gov, (202) 227-5571.
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National Artificial Intelligence Institute Mission

The National Artificial Intelligence Institute seeks to establish the Department of Veterans Affairs as the preeminent organization for research, development, and training of Artificial Intelligence with impact on a global scale, ensuring the health and well-being of our Veterans.

Our Vision

We believe that every Veteran is entitled to the highest quality of life possible. It is our obligation to serve Veterans in the same way they served us: selflessly, courageously, and relentlessly.

We see a future in which the VA provides augmented intelligence for providers, proactive and personalized care for Veterans, and a healthcare system that continuously learns from all those involved.
Introduction

As the Department of Veterans Affairs (VA) embraces emerging technologies, the National Artificial Intelligence Institute (NAII) focuses on increasing its organizational readiness to advance artificial intelligence (AI) research, development, and implementation at the frontiers of science and health to serve the nation’s Veterans.

The VA’s ownership of the largest integrated health care system in the country, its vast genomic data repositories, and its research initiatives put VA in a unique position to improve services to our Veterans and our communities. NAII is on the path to becoming an integral part of VA’s institutional leap toward AI-powered services and products.

Founded on National Veterans and Military Families Month in 2019, as a joint effort of the Office of Research and Development and the Secretary’s Center for Strategic Partnerships, the NAII has grown in this past year. Throughout 2020-2021, NAII has increased its organizational and institutional capacity by taking initiatives that are foundational to the future of VA’s work on AI-powered technologies, services, and research.

Since its inauguration, NAII has grown to include multiple staff across a burgeoning AI network of medical centers and offices at VA. NAII has introduced research and collaborative initiatives this year in pursuit of its strategic mission, working across offices, teams, and agencies. For example, the 2021 AI Tech Sprint has piloted new awards and contracting mechanisms to support research and development (R&D) by using the General Services Administration’s (GSA’s) Challenge.gov platform for national competitions to enable faster awards. This report outlines the AI Tech Sprint and other initiatives that NAII is currently undertaking.

Given the promising outcomes of NAII’s AI research collaborations across VA over the past two years, we believe that there is considerable potential, recognized and unrealized, to leverage AI and make a meaningful difference for Veterans.
In the spring of 2020, NAII worked across VA to establish an AI Task Force to draft an inclusive AI Strategy for the VA, guiding and informing its institutional efforts to embrace artificial intelligence. The VA AI Strategy identified four strategic goals:

1. **Use existing AI to improve outcomes and experiences for our Veterans.**

2. **Increase VA AI capacity and capabilities.**

3. **Increase Veteran and Stakeholder trust in AI.**

4. **Build upon the VA’s existing partnerships across agencies and industry.**

The AI Strategy includes specific strategic priorities for the next two years, including building a robust community around AI, investing in AI research, reducing barriers to implementing AI solutions, and adopting an AI maturity model. NAII drafted the strategy with the Veterans Health Administration (VHA), the Veterans Benefits Administration (VBA), the National Cemetery Administration (NCA), key stakeholders within the VA Office of Information and Technology (OIT), and the Office of the Chief Data Officer. In October 2021, VA officially announced the adoption of the AI Strategy after consultation with experts, academia, business leaders, and senior VA leadership.
AI Tech Sprints

The NAII's AI Tech Sprints provide a novel approach to innovation to meet Veteran needs. AI Tech Sprints are three-month competitive engagements that foster collaboration between industry, academia, and VA. Teams compete to create AI-enabled tools that leverage federal data to address specific Veterans’ healthcare issues.

The NAII leads AI Tech Sprints by making federal data available and incentivizing collaboration and innovation through the Government Innovation Framework, Challenge.Gov. Industry, academia, and nonprofit organizations are encouraged to work together, with input from VA researchers and clinicians. Sprint participants have access to several federal data sets, including synthetic VA data. Sprint partners iteratively design an intervention using federal and private data.

2020-2021 AI Tech Sprint

The theme for the 2020-2021 Sprint was “Veterans Not Currently Served by the VA.” Over 61 teams signed up for the 12-week sprint, an increase of 400% from the previous sprint, approaching the finish line in mid-April.

Overall, 44 teams from industry and universities participated, addressing a range of healthcare challenges such as management of chronic conditions, cancer screening, rehabilitation, patient experience, and more.

The winners of the AI Tech Sprint cumulatively received $100,000 in prize money awarded in coordination with GSA’s Challenge.gov platform. The top three teams were Behavidence, SoKat Consulting, LLC, and General Dynamics IT.

The following AI Tech Sprint projects are moving forward as pilot projects. They will be further developed and scaled for possible adoption across VA.

Mental Health Tracking Application

Mental health diagnoses are snapshots at fixed intervals, and much happens between visits that a Veteran’s provider doesn’t see. A new research study will allow Veterans to opt into a mental health tracking application that will passively monitor behavior patterns. By identifying changes in use patterns that may signify risk factors for patients with mental health conditions, providers will make timely interventions.

The NAII and the VA Office of Mental Health and Suicide Prevention are partnering with Dr. David Oslin from the Michael J. Crescenz Veterans Affairs Medical Center (VAMC) in Philadelphia, PA, who is the Principal Investigator (PI) on the study.

Physical Therapy with Data Analysis

COVID-19 has made in-person physical therapy more challenging, and musculoskeletal issues often require attention and care beyond the scope of a physical therapy clinic. By utilizing AI-powered devices to monitor Veterans undergoing physical therapy, providers will be able to prevent overuse from occurring in the first place by harnessing the power of AI for prediction and data classification. The NAII is partnering with the Physical Therapy Programs at VA hospitals in Tampa, FL and Cincinnati, OH. The hospitals will provide the PIs and the subject matter experts to evaluate the devices in a physical therapy clinic setting.
Behavidence won first place and a $50,000 prize for developing an AI-powered smartphone application that monitors Veteran activity, categorizes users by similar behavior, and flags for follow-up those at increased risk for suicide. The app has developed a digital phenotype, or model, for the usage patterns of a “typical” person with one of the listed mental health issues. The Veteran’s usage of the app is compared to this model to flag at-risk Veterans.

SoKat Consulting, LLC, scored second and received a $25,000 prize for creating a chatbot that can integrate with VA’s Blue Button medical records access. The chatbot, “Pat,” is trained on all data in a Veteran’s health record and can categorize and analyze the data. A Veteran interacts with Pat by typing a question about their health in the chat box. Pat can answer Veteran questions between visits and pull appropriate health education resources. The chatbot also has sentiment analysis built in, so if a Veteran expresses frustration with Pat, the chatbot automatically provides contact information for a VA employee.

Third place and $10,000 went to General Dynamics IT for an algorithm that can determine if the quality of an image is good enough to make a skin cancer diagnosis. The program lets the provider know quickly if the image needs to be re-taken, thereby reducing potential delays and inconvenience for Veterans. The program then uses a deep learning network to classify the lesion and prompts the healthcare provider to schedule more testing and diagnosis if indicated. Researchers are looking for more diverse patient data sets to train the deep learning network to recognize lesions in additional populations.

Developing the AI Community at VA

AI@VA Community

To communicate the importance and implications of embracing AI, NAII introduced the AI@VA Community initiative in 2021. The goal of the AI@VA community is to foster a virtual community of dedicated, passionate, and curious minds who are interested in exploring artificial intelligence, machine learning, and other frontier technologies and the impacts they will have on Veterans and their families.

For VA employees, the NAII provides opportunities for training on AI and helps build awareness about how AI can enhance VA workflows. In 2021, NAII also launched the AI@VA Community SharePoint hub for VA employees to foster collaboration and innovation around AI at VA.

The NAII also engages Veterans, government employees outside VA, industry members, and other interested individuals. To keep members of the AI@VA community involved and informed, NAII sends a periodic newsletter highlighting impactful AI work across VA. The newsletter provides updates on the NAII, opportunities for collaboration on bleeding-edge projects, and invitations to upcoming AI webinars and meetings.
The AI@VA Community membership continues to grow. Leveraging opportunities such as National AI Week in May, NAll shares current information to increase awareness about AI at VA with stakeholders and media.

AI Network

The AI Network seeks to build AI R&D capacity across the VA enterprise by establishing virtual centers with different foci of interest. Engagement with external partners, including using the Intergovernmental Personnel Act Mobility Program to bring in AI expertise, will help expand AI R&D capacity to ensure that AI use cases for today and the future are enabled.
BRAIN Summit

NAII is planning the Brain, Rehabilitation, & Artificial Intelligence Network (BRAIN) Summit to showcase cutting-edge AI interventions, create opportunities for collaboration, and spread innovation and best practices across VA in key brain-centric health topics. The Summit will bring together VA clinicians, researchers, industry leaders, academia, non-profit organizations, and federal agencies to discuss potential collaborations on AI programs and pilots that enhance Veteran health services.

The BRAIN Summit will provide VA staff with opportunities to connect with leaders in AI and medicine, share best practices, and learn how to implement AI-driven approaches.

The Summit will help VA identify emerging AI interventions and tools across sectors to enhance diagnostic, preventative, and monitoring practices, thereby increasing the standard of care for Veterans.

Pilot Projects

COVID-19 120-Day Mortality Model Piloting Trustworthy AI

AI has been part of the global response to the COVID-19 pandemic, helping health professionals, scientists, and other experts keep up with the tremendous volume of literature, data, and novel interventions being developed.

The NAII successfully collaborated with the Washington DC Veterans Affairs Medical Center (VAMC) to provide resources and guidance in development of a machine learning model to predict the acuity of a COVID-19 patient’s disease course.
The model helps medical staff identify high-risk patients who are isolated at home. The model also includes post-hospitalization insight that may assist clinicians in determining how to allocate supplies of remdesivir, a COVID-19 treatment, to acute COVID-19 patients. The model aggregates multiple data sources to provide valuable support to physicians in their decision-making.

NAII has shared the COVID-19 mortality model with 13 urban and rural pilot sites. The model has been used to examine how AI can support operations, strategic planning, and palliative care coordination. Based on feedback after working with 13 VAMCs, the NAII is engaging the Data Analytics Services (DAS) to make further enhancements to the tool.

Digital Command Center

The Digital Command Center (DCC), once fully operationalized, will use predictive analytics, paired with AI, to make it easier for VA to consolidate, track, and share data among medical center administrators. Due to the substantial amount of data at each VAMC, it is currently difficult to consolidate information, resulting in delays. The DCC develops a digital hub of all hospital data, then applies predictive analytics to allow administrators to make informed and timely decisions for the benefit of Veterans. The first DCC will be at the Timor Rubin VAMC in Long Beach, CA.

Artificial intelligence continues to play a significant role in the pandemic response by summarizing critical findings of COVID-related papers, predicting the future incidence of disease on a county-wide level, and even assisting in vaccine development.

Suicidal Ideation

Text Screening

Timely identification of Veterans in crisis is imperative for lifesaving interventions. Every moment counts. The VA Veterans Crisis Line aims to identify Veterans in crisis and generate referrals to care. However, the current rule-based filtering has resulted in a high false-positive rate (70%), overloading the crisis line. Implementing a natural language processing engine will allow quicker, more accurate filtering of text responses, enabling the Veterans Crisis Line to identify and help Veterans in crisis more quickly. The NAII continues to support this mission critical project.
Brain Health & Smart Wearable Pilot

Wearable technology has rapidly advanced in recent years, particularly in health sensing capabilities. Advances in vital signs monitoring capabilities, including oxygen, heart, and sleep monitoring, have allowed AI-powered technologies to diagnose patients and detect abnormalities. Through continuous sensing and monitoring, wearable devices fill a niche that supplements the work of healthcare professionals to provide a complete view of a patient’s health.

A joint effort of VA and the Snyder Lab at Stanford University, with collaboration from the Department of Defense (which will expand its efforts into the Department of Homeland Security), the Precision Brain Health pilot will use live data from a combination of wearables, utilize (multiomic) sampling, and extensive additional data stores to enhance monitoring capability.

AI is used to analyze the combination of data in order to simultaneously (1) develop and test methods for better post-traumatic stress disorder (PTSD) and suicidality detection and treatment, and (2) track the effects of stress, sleep, diet, and other variables from basic training through a Veteran's retirement.

Using bleeding-edge analytics alongside novel secure data exchange and sharing methods, the Precision Brain Health pilot offers the chance to make valuable advancements in care and discoveries about the human body, while helping to provide a complete view of a patient’s health.

AI Training

The Washington DC VAMC is working in coordination with the NAII to develop training modules and curriculum for AI researchers, clinicians, and healthcare executives who need to understand the capabilities and limitations of AI. The initial pilot will allow 60 researchers, 20 senior executives, and ten attendees of AI project management certification to participate in the project.
Partnerships

The NAII has been developing partnerships with research universities and industry, notably with the Stanford Institute for Human-Centered Artificial Intelligence. The NAII continues to explore collaborations with industry and AI Tech Sprint participants to find areas of synergy and collaboration for future pilot projects.

Talent, Education, and Assessment Management System

VA understands that as AI adoption advances, how organizations assess their workforce knowledge and skills will change. Therefore, VA is partnering with more than 30 agencies and interested parties across the federal government and academia to develop the Talent, Education, and Assessment Management System (T.E.A.M.S.) initiative.

T.E.A.M.S. introduces a single standard for evaluating AI practitioners’ knowledge in key AI domains. T.E.A.M.S. will determine necessary knowledge and competencies and establish a baseline for measuring the impact of future training and recruitment efforts.

T.E.A.M.S. is designed to support AI integration and help scale the workforce accordingly. AI-powered models will enhance workforce recruitment, assessment, education, and transition to increase AI utilization. The Initiative will enhance national security and federal workforce development.

NAII’s federal partners for the pilot phase include the Department of Health and Human Services, the General Services Administration, the Office of the Director of National Intelligence, NavalX, the Joint AI Center at the Pentagon, and the Navy Postgraduate School. University and industry partners include Harvard University, Johns Hopkins University, and the Academic Venture Exchange.

T.E.A.M.S. will contribute to consistent standards in AI education and training across the public and private sectors, control costs across government agencies which adopt these unified standards, and help ensure that the federal workforce has the AI training and skills needed for the 21st century.
**Data Scientist Hiring Sprint**

NAII supported the Data Analytics Workgroup as Co-Chair, helping to launch a government-wide sprint to hire GS-13 and GS-14 data scientists with exceptional qualifications. This process addressed long-standing challenges in classifying and recruiting for these positions. NAII shared the new position descriptions with the VA Office of the Chief Human Capital Officer, the VA Financial Services Center, and other national and local VA programs to support their recruitment efforts.

**Cooperative Research and Development Agreements**

NAII is working with partners to establish a standard process and method of evaluation for de-identifying the data being used for AI before it is shared with partners. Using the Google DeepMind CRADA focused on Acute Kidney Injury and others as case studies, VA is exploring participation in additional high-impact research studies with industry partners.

**Processes**

**AI-To-Go Framework**

As VA’s capacity and portfolio of AI R&D increases, there will be a need to create a pipeline for AI research to transfer to validation, user acceptance, and VA-wide implementation. The NAII’s AI-To-Go framework will deliver a key capability of that process. This framework will enable models to be compared against one another for performance, while receiving input from clinicians on the value and impact of the information, prior to a model being transitioned to a pilot. The process includes checklists and Institutional Review Board modules for users, researchers, clinicians, and other practitioners.
Policies

Guidance for Regulation of AI Applications

The NAII is collaborating with senior leadership and offices across VA to develop policies, processes, and procedures related to AI at VA. For example, working in partnership with offices across VA, the NAII drafted guidance on how VA will comply with Executive Order 13859: Maintaining American Leadership in Artificial Intelligence. After approval by all contributors, the guidance document was posted on VA’s website.

Executive Order on Trustworthy AI

NAII senior leadership worked in coordination with other agencies, the Chief Information Officers Council, and the White House to draft the initial language for Executive Order 13960: Promoting the Use of Trustworthy Artificial Intelligence in Government. Since the directive was signed on December 3, 2020, the NAII has provided guidance and leadership in its implementation.

NAII is working with partners across VA to build a national library of use cases to establish a baseline for evaluating AI against the principles established for Trustworthy AI.
NAII collaborations have resulted in a number of publications. For a complete list of publications, please check the NAII’s website.

**Using Artificial Intelligence to Create Risk Scores: From Evidence to Practice in the Department of Veterans Affairs**

*BMJ Health & Care Informatics*

Christos Makridis with Tim Strebel, Vincent Marconi, and Gil Alterovitz

Using administrative data on all Veterans who enter the Department of Veterans Affairs Medical Centers (VAMCs) throughout the United States, this paper uses machine learning methods to predict mortality rates for COVID-19 patients between March and August 2020. First, we estimate five AI models using comprehensive data on over 10,000 Veterans’ medical history, demographics, and lab results. Our models were designed to optimize for multiple metrics, rather than traditional approaches that optimize for AUROC. The best produced an AUROC and AUPRC of 0.87 and 0.41, respectively. Second, through a unique collaboration with the Washington DC VAMC, we develop a dashboard that incorporates these risk factors and the contributing sources of risk, which we deploy across local VAMCs.

**Leveraging Machine Learning to Characterize the Role of Socio-Economic Determinants on Physical Health and Well-Being Among Veterans**

*Computers in Biology and Medicine*

Christos Makridis with David Zhao, Adi Bejan, and Gil Alterovitz

Understanding the contribution of demographic, socio-economic, and geographic characteristics as determinants of physical health and well-being is essential for guiding public health policies and preventative behavior interventions, particularly with the spread of coronavirus. We leverage several machine learning methods to build predictive models of overall well-being and physical health among Veterans as a function of these three sets of characteristics. We link Gallup’s US Daily Poll between 2014 and 2017 over a range of demographic and socio-economic factors with zip code characteristics from the Census Bureau to build predictive models of overall and physical well-being.

Although the predictive models of overall well-being have weak performance, our classification of low levels of physical well-being performed better. The best model showed 80.2% precision, 82.4%
How Much Does the (Social) Environment Matter? Using Artificial Intelligence to Predict COVID-19 Outcomes with Socio-demographic Data

Pacific Symposium on Biocomputing
Christos Makridis with Anish Mudide and Gil Alterovitz, PSB Conference

Ethical Applications of Artificial Intelligence in Veterans’ Health Research

Journal of Internet and Medical Informatics
Christos Makridis with Seth Hurley, Molly Klote, and Gil Alterovitz

While the coronavirus pandemic has affected all demographic brackets and geographies, certain areas have been more adversely affected than others. This paper focuses on Veterans as a potentially vulnerable group that might be systematically more exposed to infection than others because of their co-morbidities, i.e., greater incidence of physical and mental health challenges. Using data on 122 Veteran Healthcare Systems (HCS), this paper tests three machine learning models for predictive analysis. The combined LASSO and ridge regression with five-fold cross-validation performs the best. We find that socio-demographic features are highly predictive of both cases and deaths – even more critical than hospital-specific characteristics. These results suggest that socio-demographic and social capital characteristics are important determinants of public health outcomes, especially for vulnerable groups, like Veterans, and should be investigated further.

The primary contribution of this paper is to explore the ethical applications of AI by building on the Belmont Report and relating it to the principles established in the recent executive order on trustworthy AI. Although data ethics and privacy have been recognized within the federal government, a new challenge has emerged: how can the federal government balance the competing priorities of stewarding sensitive data and analyzing it to guide operational objectives? To answer this question, we apply the perspective of the Veterans Health Administration (VHA), within the Department of Veterans Affairs (VA), which has the most extensive integrated healthcare system in the country and has pioneered several technological aspects now widely seen across the U.S. such as electronic health records. More than half of doctors training within the U.S. receive some training at a VA medical center. By
evaluating uses for AI and implications in healthcare, Veteran input and priorities can be proactively developed to enhance care. The recent executive order, “Promoting the Use of Trustworthy Artificial Intelligence in Government,” provides an exceptional framework as the VA moves forward with utilizing AI to improve Veteran health. We focus on three principles that are especially relevant to the advancement of the health and well-being of Veterans: (i) purposeful & performance-driven, (ii) accurate, reliable, & effective, and (iii) understandable.
Quick Links

- **VA AI Strategy**
  - VA AI Strategy News Release
- **Guidance Documents**
- **National AI Policies**
- **AI Tech Sprints**
- **Join the AI@VA Community**
- **AI.gov**

Contact the NAI

Whether you want to participate in a Tech Sprint, partner on research, or simply have a suggestion or comment, we hope you’ll join the exciting conversation about the intersection of AI and Veteran health and well-being. For questions and comments, please email NAII@va.gov.
# Appendix

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<td>AI</td>
<td>Artificial Intelligence</td>
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<tr>
<td>BRAIN</td>
<td>Brain, Rehabilitation, &amp; Artificial Intelligence Network Summit</td>
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<tr>
<td>DCC</td>
<td>Digital Command Center</td>
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<td>GS</td>
<td>Government Schedule - Refers to the employee level and pay grade schedule used by the Office of Personnel Management for federal employees</td>
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<tr>
<td>GSA</td>
<td>General Services Administration</td>
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<td>NAII</td>
<td>National Artificial Intelligence Institute</td>
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<td>OIT</td>
<td>VA Office of Information and Technology</td>
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<tr>
<td>PI</td>
<td>Principal Investigator</td>
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<tr>
<td>R&amp;D</td>
<td>Research &amp; Development</td>
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<td>VA</td>
<td>U.S. Department of Veterans Affairs</td>
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<td>VAMC</td>
<td>Veterans Affairs Medical Centers</td>
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<td>VBA</td>
<td>Veterans Benefits Administration</td>
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<td>VCA</td>
<td>Veterans Cemetery Administration</td>
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<tr>
<td>VHA</td>
<td>Veterans Health Administration</td>
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15 1. Build a robust community and network around Artificial Intelligence at the VA
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Executive Summary
The Artificial Intelligence (AI) Strategy formalizes the vision for how the Department of Veterans Affairs (VA) will develop, use, and deploy artificial intelligence (AI) capabilities. Informed by the National Defense and Authorization Act (NDAA), the strategy will benefit the nation’s Veterans and society, building on the American AI Initiative that was signed in 2019 and codified into law in the National AI Initiative Act of 2020. The VA-wide AI Task Force has developed the VA AI Strategy. The AI Executive Steering Group that will be established and defined by the Data Governance Council (DGC) in consultation with the current VA-wide AI Task Force will execute the VA AI Strategy.

According to Stanford’s Human-Centered AI Institute’s AI Index 2017 Report, AI tools have reached or exceeded human-level performance in narrowly defined tasks, including strategy games, visual image detection, and parsing natural language. Such performance creates new capabilities for improving service delivery, preventing and treating disease, and reducing barriers to Veterans applying for their earned benefits. To take advantage of these advances, the VA must understand both the potential and the risks of AI and how to embed AI and Machine Learning (ML) in the federal government to deliver more excellent value to our Veterans and the American people.

Although every federal agency will need to prioritize AI, the VA is uniquely suited to leverage it for at least two reasons. First, the VA has the most comprehensive combined administrative, financial, and medical record databases globally, providing important data sets for the training and testing of AI capabilities for improving health outcomes for our Veterans. Second, the decentralized network of local VA facilities can unite end-users and researchers across the country with close links to academic institutions and innovative private-sector counterparts. Utilizing the extensive VA network already in place, our goal is to become a hub for AI activity across the federal government to ensure that Veterans can benefit from the significant technological advances that are already happening.
Our strategy consists of four specific goals.

**First**, we will use existing AI capabilities to improve Veteran outcomes and experiences across the spectrum of benefits and services the VA provides. For example, we are leveraging existing computer vision technologies to identify disease early and improve treatment outcomes.

**Second**, we will increase VA AI capacity and capabilities. We can accomplish this by pioneering new processes for writing collaborative research agreements with third parties and actively supporting new research in academic journals.

**Third**, we will increase Veteran and Stakeholder trust and confidence in AI. To this end, we are working to educate VA leaders and researchers on the principles of transparency, bias, and understandable AI.

**Fourth** and finally, we will expand upon the VA’s existing partnerships across federal agencies and industry. The VA is already collaborating with other federal agencies on research and data sharing and overseeing AI technology sprints that bring industry partners to the table with specified objectives so that their participation creates a win-win opportunity. We will seek to build on these efforts and identify new approaches to collaboration that will accelerate the rate of knowledge discovery.

The Veterans Affairs AI Strategy articulates a clear vision. It also establishes a concrete set of goals, metrics, and priorities to help ensure that the VA is effectively tapping into the full capabilities of AI across all its initiatives. A clear strategy will enable the Department of Veterans Affairs to be a leader in Artificial Intelligence and change what is possible in healthcare and benefits delivery.
Introduction
In response to Executive Order 13859 on Maintaining American Leadership in Artificial Intelligence, the Department of Veterans Affairs conducted a comprehensive review of existing efforts and opportunities around Artificial Intelligence. The Department also held a series of strategy sessions to identify a vision, mission, and strategic goals for developing and implementing AI capabilities within the VA. The specific AI goals for the Department of Veterans Affairs are aligned with the National Artificial Intelligence Research and Development Strategic Plan. They are framed to keep our Veterans and our Mission at the center of everything that we do.

**VA Artificial Intelligence Vision Statement**

The VA’s Artificial Intelligence vision is to improve outcomes and experiences for our Veterans by developing trustworthy Artificial Intelligence capabilities to support the Department of Veterans Affairs mission.

**Mission Statement**

The Department of Veterans Affairs will build robust capacity in Artificial Intelligence to develop and apply innovative AI solutions and transform the VA by facilitating a learning environment that supports the delivery of world-class benefits and services to our Veterans.
Aligning with National AI Strategic Goals

The National Artificial Intelligence Initiative Act of 2020 proposes an updating of national AI strategy every three years. The most recent strategy (2019) has identified eight strategic objectives as part of National AI R&D Strategic Plan. Combining these with executive orders on maintaining American leadership in AI and Trustworthy AI provides additional guiding principles. Building on this work, and aligning with the National AI Initiative Act of 2020’s goals, four strategic objectives that strongly correlate with the VA’s mission are listed below:

**Strategy 1:** Use existing AI to improve outcomes and experiences for our Veterans.
- Develop shared public datasets and environments for AI training and testing.
- Measure and evaluate AI technologies through standards and benchmarks.

**Strategy 2:** Increase VA Artificial Intelligence capacity and capabilities.
- Make long-term investments in AI Research.
- Develop effective methods for human-AI collaboration.
- Develop shared public datasets and environments for AI training and testing.
- Better Understand the National AI R&D Workforce Needs.

**Strategy 3:** Increase Veteran and stakeholder trust in AI.
- Understand and address the ethical, legal, and societal implications of AI.
- Ensure the safety and security of AI Systems.

**Strategy 4:** Build upon the VA’s existing partnerships across agencies and industry.
- Expand Public-Private Partnerships to Accelerate Advances in AI.

The VA strategy seeks to align with this work and build on VA’s Data strategy and other recent foundational agency efforts.
The VA AI Strategy
**Strategy 1:**

**Use existing AI to improve outcomes and experiences for our Veterans.**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Key Performance Indicators</th>
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<tbody>
<tr>
<td>1. Create and maintain inventories of VA AI applications, industry capabilities, and VA use cases.</td>
<td>1. Completion of annual AI Practice &amp; Use Case Inventories.</td>
</tr>
<tr>
<td>2. Establish standards and benchmarks for evaluating all AI solutions against existing regulations, applying Trustworthy AI principles, customer satisfaction, performance, and ROI.</td>
<td>2. Percentage of Agency use cases evaluated against outcome/implementation cost metrics.</td>
</tr>
<tr>
<td>3. Design and conduct pilots using AI to improve value, outcomes, and experiences.</td>
<td>3. Change in Patient/Caregiver Outcomes &amp; Satisfaction in Pilot Areas.</td>
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<tr>
<td>4. Create a development and funding pipeline for scaling successful pilots to the enterprise level.</td>
<td>4. Demonstrate Cost Savings as a Result of AI Implementation for pilots and scaled solutions.</td>
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<tr>
<td>5. Integrate ML Ops into the existing DevOps framework to ensure that AI products are efficiently transitioned, integrated, maintained, and monitored.</td>
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There is now a large body of empirical evidence that AI can deliver substantial productivity and social gains if used and deployed appropriately, ranging from examples such as the early detection of cancer to detection of fraud in administrative systems.

In recent years, the use of Artificial Intelligence techniques has been shown to be able to improve operations and outcomes in business and other processes. Integrating these techniques (machine learning, computer vision, natural language processing, etc.) with existing VA business processes could improve efficiencies, scale solutions, and transform how the Department of Veterans Affairs operates. Hence, the first component of our strategy is to ensure that existing AI technologies are being used appropriately to improve outcomes and experiences for our Veterans, their families, and caregivers.

Implementing this strategy will require an enterprise-wide catalog of existing AI solutions and proposed use cases. Use cases will be evaluated against existing solutions to identify potential impact, barriers to implementation, and anticipated return on investment. The success and potential impact of any given AI application will be measured across three key performance metrics: customer satisfaction, other measurable outcomes, and return on investment (ROI). For the most impactful solutions, pilot studies will be conducted to determine the suitability of a solution and validate its performance prior to scaling them across the enterprise.
Finally, existing AI solutions will be monitored for performance and bias to ensure that the VA continues to derive the maximum benefit from these solutions. Applications whose performance, integrity, or usefulness have deteriorated will be addressed, and new use cases evaluated against the continually expanding capabilities of Artificial Intelligence and to ensure they meet the 9 principles of the Trustworthy AI executive order.
## Strategy 2: Increase VA Artificial Intelligence capacity and capabilities.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conduct and promote cutting-edge research into Artificial Intelligence applications and capabilities.</td>
<td>1. Growth in number of AI Research Studies and Pilots conducted.</td>
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<tr>
<td>2. Continually assess AI workforce capabilities to identify gaps between mission needs and VA capabilities.</td>
<td>2. Trended results of VA workforce need and capability assessments.</td>
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<tr>
<td>3. Provide AI skills training to VA researchers and developers.</td>
<td>3. Size and competencies of VA AI &amp; Data Science Workforce.</td>
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<tr>
<td>4. Establish clear guidelines for what types of AI pilots require clearance through IRB approval, Privacy Office approval, and regulatory agencies like the FDA.</td>
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<tr>
<td>5. Recruit world-class AI Professionals and Data Scientists.</td>
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In addition to the existing AI techniques, new AI concepts are constantly emerging. Many of the most promising use cases for AI technology throughout the VA will benefit from long-term, fundamental investigations, and research. Specific areas of interest include developing ML capabilities to learn interactively, effectively, and persistently, the connection between perception and attention, human-like interaction, and the incorporation of learned models into comprehensive reasoning architectures. There is also a need for critical research in other core areas of AI. Those areas include commonsense reasoning and problem-solving, probabilistic reasoning, combinatorial optimization, knowledge representation, planning and scheduling, natural language processing, decision making, adapting AI for improved scalability and hardware, and trustworthiness and human interaction elements which are identified in Strategy 3.

Advances in these areas will enable advanced intelligent assistants, collaborative robotics, and fully autonomous systems. The development of standards and benchmarks is essential for measuring and evaluating emerging AI technologies to ensure they meet functionality, efficacy, and interoperability objectives.

The growing prevalence of AI technologies across all sectors of society creates new pressures for senior leaders to develop AI leadership competencies. This knowledge, diffused throughout the organization, will allow the Department of Veterans Affairs to increase trust and confidence in AI through education and engagement with beneficial programs.

Opportunities abound for core AI scientists and engineers with a deep understanding of the technology who can generate new ideas for advancing the boundaries of knowledge in the field. The VA must take the initiative to ensure a robust training program for current AI researchers and a recruitment pipeline for needed AI-capable talent.
Strategy 3: Increase Veteran and stakeholder trust in AI.

Objectives

1. Make available trustworthy AI training and other relevant resources to VA leadership, practitioners, and relevant end-users.
2. Build a community around AI that fosters learning and intra-agency collaboration.
3. Develop and distribute trustworthy AI Best Practices and management principles to ensure use cases are ethical, legal, and effective.
4. Assess the trust and concern expressed regarding AI by end-users and beneficiaries.
5. Develop a procedure for trustworthy AI certification that ensures the development and training of AI is based on representative samples that reflect the stakeholders that the VA services.

Key Performance Indicators

1. Percent of VA Leaders trained in AI management principles.
2. Size and engagement of Al@VA Community.
4. Results of surveys targeting AI trustworthiness.
5. Percentage of AI tools that meet criteria for trustworthy AI certification.
6. Percentage of VA employees that complete AI ethics training.

Despite unprecedented technological advances in AI, it will only have a positive social impact if the public trusts AI R&D processes and the use of AI. In addition to using AI responsibly, the clinical outcomes must be demonstrably improved in the absence of negative experiences that undermine trust. In the absence of that trust, particularly among Veterans, the VA cannot serve its primary stakeholder. Moreover, confidence in the application of AI will fuel continued investments in its R&D and pilots, which helps ensure continuous innovation. Fortunately, the federal government has recently adopted a new framework of trustworthy AI. The VA is implementing and applying that framework to all existing and future AI use cases.

To achieve trustworthy AI, initiatives must be established across the AI lifecycle from design to implementation. Further, employees engaged in the design, use, and dissemination of AI will benefit from trustworthy AI training opportunities. Empowering a community of dedicated VA employees passionate about AI technologies will serve to foster learning, collaboration, and the development of trustworthy AI. Once AI tools are implemented, it is necessary to monitor AI to ensure reliability, accuracy, effectiveness, and fairness. AI design and implementation need to be transparent and accountable to enable effective monitoring of AI. The VA must identify best practices that address understandable AI, developing unbiased and fair AI, AI tool integrity, and incorporate human-centered design.
## Strategy 4: 

**Build upon the VA’s existing partnerships across agencies and industry.**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Find industry leaders and practices that best align with VA Mission and Goals.</td>
<td>1. Number of shared public datasets and environments for AI training and testing.</td>
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<tr>
<td>2. Collaborate with VA Governance Boards for AI implementation guidance.</td>
<td>2. Number of Cooperative Research and Development Agreement (CRADA) and other strategic AI agreements executed annually</td>
</tr>
<tr>
<td>3. Develop shared public datasets and environments for AI training and testing.</td>
<td>3. Participation in VA Governance councils for collaboration</td>
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<tr>
<td>4. Expand Public-Private Partnerships to Accelerate Advances in AI.</td>
<td>4. Agencies represented in AI@VA communities</td>
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<tr>
<td></td>
<td>5. Shared projects or best practices across agencies.</td>
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<tr>
<td></td>
<td>6. Size and conversion percentage of AI use case library.</td>
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The constant advancements in artificial intelligence applications have transformed the way businesses work. AI enables faster, innovative new solutions and services and more informed decisions, which were missing in the absence of AI.

Artificial Intelligence technology is blossoming faster than ever imagined. As complex as AI sounds at the outset, AI tools have increasingly become easier to use. Thanks to engineers from tech giants such as Google, Facebook, and Uber and developers who routinely contribute to the open-source AI community and partnerships, AI is driving rapid innovation.
The VA AI Strategy will be continuously reviewed and updated to ensure its relevance and ability to support the Department of Veterans Affairs mission. Since the National Artificial Intelligence Initiative Act of 2020 requires updating the National AI Strategy every three years, the VA will update its AI strategy accordingly. In the next two years, the followings actions have been identified as having the most significant potential to impact the future of Artificial Intelligence within the VA:

1. **Build a robust community and network around Artificial Intelligence at the VA**

   The VA can accelerate the adoption of Artificial Intelligence solutions by building a robust cohort of strategic partners and investing in its community of practitioners. Working across government, industry, and academia, the Department of Veterans Affairs can break down silos and collaborate to rapidly expand AI capabilities, increase efficiencies across government, and provide world-class service to our Veterans.

   The more agencies collaborate on data harmonization and AI research & development, the better it is. Researchers will benefit from integrated data points there were not available before. Enabling an AI network of researchers and practitioners across the country’s medical centers can serve as an integrated resource to be called upon, as needed, and for novel research to be quickly deployed. These capabilities could provide significant value to the VA’s continued efforts, such as initiatives to prevent Veteran suicide and end Veteran homelessness.

   Within the VA, we will form a tightly knit community focused on developing AI professionals, connecting them with peers & mentors, and identifying innovative solutions to tomorrow’s challenges. These thought leaders will act as force multipliers for socializing AI concepts and championing new practices across the enterprise. By engaging with our community of practitioners, we can invest in their development while aligning their efforts with our strategic goals and objectives.
The VA possesses one of the richest datasets in the world, encompassing clinical care, benefits administration, fiscal processes, and administrative data. By investing in data as a strategic asset, the VA can ensure AI-Ready datasets are available for research & development. Further, by prioritizing VA funding for Artificial Intelligence research, VA researchers can have a tremendous impact on the pace and direction of AI and AI-enabled research for the foreseeable future. The significant value AI can bring to our mission will continue to grow and compound as our investment in AI research translates what is theoretically possible into best practices for adoption. The results of these efforts can be further reinvested by applying new AI techniques to research questions in a myriad of fields and disciplines.

When AI research produces new insights, that investment in research must be fully realized by translating those insights into new capabilities to serve our Veterans. To that end, the VA will establish clear processes and resources to support the development and testing of new AI solutions, piloting them for feasibility and supporting their adoption across the enterprise.

The VA will create a common extensible environment for AI development and testing. Mature models will have clearly defined pathways for validation, testing, and certifying readiness for integration with operations. Multi-disciplinary pilots will be supported by ensuring adequate appropriation set-asides to increase VA’s agility in responding to emerging use cases and circumstances.

By adopting an AI maturity model, the VA will conduct an in-depth assessment of its current use cases, capabilities, and resources. Once complete, the maturity model will assist in aligning AI strategy with data, technology, talent, and policy to create new opportunities and solutions to improve outcomes and experiences for our Veterans. Identification of capability gaps, a product of in-depth assessment, will identify areas for investment and training at each stage of the maturity model to ensure resource investments are always maximizing their benefit to those we serve.
Conclusion
The emergence of Artificial Intelligence offers the potential for significant social, fiscal, healthcare, and economic benefits. Never before has the expansion of data at scale, the computing power, talent, and the reliability of available algorithms converged to deliver so much potential value, allowing researchers and the agency alike to make incredible scientific, organizational, and educational discoveries.

The Department of Veterans Affairs recognizes the development and implementation of AI comes with incredible potential benefits and inherent risks. Committing to a formal and explicit AI strategy will realize the benefits of AI for our nation’s Veterans and properly mitigate any associated risks. Furthermore, the vision and mission of the VA Artificial Intelligence Strategy establish a concrete set of objectives and metrics that can be used to measure success and identify opportunities to pivot.

The actions identified for execution by this strategy represent early areas of emphasis that have the potential to rapidly increase the VA’s Artificial Intelligence capabilities and capacity. Building a strong network that spans government, industry, academia, and our own internal communities will unchain innovation and empower practitioners to identify and propose solutions to problems in real-time. Investing in AI Research and the datasets that enable it will allow the VA to solve previously insurmountable problems. For instance, the use of AI could help us predict acute kidney injury (AKI) up to 48 hours in advance, providing clinicians a chance to take mitigating actions. Therefore, ensuring that a pathway exists from research to operational impact is the only way to realize the full value of our investments in research. Finally, adopting and monitoring an AI Maturity Model will provide confidence that the VA remains on track to become a world leader in the use of Artificial Intelligence to improve lives. For additional inquiries, please refer to the VA National Artificial Intelligence Institute as Point of Contact (POC) (naii@va.gov).
Thank you for attending the 2022 VA NAIi BRAIN Summit. We greatly appreciate your support and input on our efforts to support Veterans through AI.

To stay up to date on NAIi initiatives and events, please visit our webpage through the QR code above and sign up for our AI@VA community.