

Aize Cao, PhD
Meharry Medical College
1005 Dr. D.B. Todd Jr. Boulevard
Nashville, TN
(615) 473-2281
acao@mmc.edu

Last updated: March 4, 2021

Current Position

Associate Professor, School of Applied Computational Sciences
Meharry Medical College
Nashville, TN

Education

Ph.D. in Data Mining and Pattern Recognition, Nanyang Technological University, Singapore	2005
M.S. in Biostatistics, Middle Tennessee State University, Murfreesboro, TN	2013
M.S. in Optical and Electronic Engineering, Changchun Institute of Optics and Fine Mechanics, Chinese Academy of Science, Changchun, China	1996
B.S. in Optical and Electronic Engineering, Beijing Institute of Technology, Beijing, China	1993

Academic Appointments

Adjunct Professor in Data Science College of Computing Technology Lipscomb University Nashville, TN	2019-2020
Research Assistant Professor Department of Biomedical Informatics Vanderbilt University Medical Center Nashville, TN	2016-2020

Professional Positions and Experience

Computer Analyst II, Center for Improving the Public's Health Using Informatics Vanderbilt University Medical Center Nashville, TN	2015-2016
Computer Analyst II, Vanderbilt Institute for Medicine and Public Health Vanderbilt University Medical Center Nashville, TN	2013-2015
Intern Tennessee Department of Health Nashville, TN	2013
Neuro-Imaging Analyst, Vanderbilt University Institute of Imaging Science Vanderbilt University Medical Center Nashville, TN	2008-2012
Research Associate, Biomedical Modeling Laboratory Department of Biomedical Engineering Vanderbilt University Nashville, TN	2005-2007

Research Assistant, Intelligence Machine Research Lab
School of Electrical and Electronic Engineering
Nanyang Technological University
Singapore 2001-2004

Research Engineer 1996-2001
Tianjin Institute of Technical Physics
Tianjin, China

Professional Development

Observational Health Data Science and Informatics Common Data Model Implementation for National
Veteran Affairs Healthcare records 2018-Present

Data informatics and predictive modeling for patients with cirrhosis based on nationwide Veterans
Healthcare data, including patients' demographics, disease history, lab test, utility use and medication,
etc. 2015-2017

Healthcare model evaluation for inpatient care transition and outpatient medical home based on large-
scale hospital-wide administrative, clinical and financial data, claim based Medicare data and survey data
2013-2015

Alzheimer study in TN based on State-wide Death Statistical System, Hospital Discharge Data System
and population survey data set. 2013

Neuroimaging analysis in supporting metal disease studies 2008-2012

Multi-model image registration in model-updated image-guided neurosurgery system 2005-2007

Professional Memberships and Activities

Clinical Informatics Research 2019-2020
IEEE Transaction on Biomedical Engineering 2005

Educational Activities

Lecturer, Principles of Informatics/Principles of Data Science, Graduate/Undergraduate
Fall 2020
Lecturer, Principles of Statistics and Decision Modeling, Graduate
Spring 2020
Fall 2019
Spring 2020
Lecturer, Predictive Analysis and Data Mining, Graduate
Fall 2020
Summer 2020
Fall 2019
Summer 2019

Grants and Contract Awards

Vanderbilt Kennedy Center Discovery Award, Warren, Zachary E. (PI), Can Computational Surveillance
of Autism Spectrum Disorder Fuel Big-Data Science? 20% effort, 2020, data analysis

National Veteran Health Administration (VHA) VINCI (VA Informatics and Computing Infrastructure)
OMOP Common Data Model, Scott DuVall (lead), Michael Matheny, 20%-98% effort, 2016-present, ETL
and QA.

VA HSR&D 2014-06-009D, Michael Matheny (PI). Automatic Surveillance and Intervention among Patient
with Liver Cirrhosis, 20%-60%, 2015-2018, Data analysis

1C1CMS330979, Robert Dittus (PI), CMS: My Health Team: Regional Team-Based & Closed Loop Control Innovation Model for Ambulatory Chronic Care Delivery, 100%, 2013-2015, data analysis.

R01 NS049251, Michael I Miga (PI), NINDS: Multimodal Registration of the Brain's Cortical Surface, 100%, 2005-2007, postdoc training

Publications

Refereed Journal Publications

1. Fern FitzHenry, Svetlana K. Eden, Jason Denton, Hui Cao, **Aize Cao**, Ruth Reeves, Guanhua Chen, Glenn Gobbel, Nancy Wells, and Michael Matheny, 'Prevalence and Risk Factors for Opioid-Induced Constipation in an Older National Veteran Cohort', *Pain Research and Management*, 2020.
2. Jejo D. Koola, Sam B. Ho, **Aize Cao**, Guanhua Chen, Amy M. Perkins, Sharon E. Davis, Michael Matheny, 'Prediction 30 day hospital readmission risk in a national cohort of patient with cirrhosis', *Digestive Diseases and Sciences*, 2020(65), 1003-1031
3. Kristine E. Lynch, Stephen A. Deppend, Scott L. DuVall, Benjamin Viernes, **Aize Cao**, Daniel park, Elizabeth Henschrow, Kushan Hewa, Michael Matheny, 'Incrementally transforming electronic medical records into the OMOP common data model: A multidimensional quality assurance approach', *Applied Clinical Informatics*, 2019 10(5), 794-803
4. Sunil Kripalani, Guanhua Chen, Philip Ciampa, Cecelia Theobalk, **Aize Cao**, Megan McBride, Robert S. Dittus, 'A transition care coordinator model reduces hospital readmissions and costs', *Contemporary Clinical Trials*, 2019, June, 81:55-61.
5. Joseph Boyle, Ted Speroff, Katie Worley, **Aize Cao**, Kathryn Goggins, Robert S. Dittus, Sunil Kripalani, 'Low health literacy is associated with increased transitional care needs in hospitalized patients', *Journal of Hospital Medicine*, 12(11): 918-924, 2017
6. Jacqueline A. Clauss, April I. Seay, Ross M. Vanderklok, Suzanne N. Avery, **Aize Cao**, Ronald L. Cowan, Margaret M. Benningfield, and Jennifer U. Blackford, 'Structural and functional bases of inhibited temperament', *Social Cognitive and Affective Neuroscience Advance Access*, 9: 2049-2058, 2014.
7. Xulei Yang, **Aize Cao**, Qing Song, Gerald Schaefer, Yi Su, 'Vicinal support vector classifier using supervised kernel-based clustering', *Artificial Intelligence in Medicine*, 60(3): 189-196, 2014.
8. Carissa J Cascio, Jennifer H Foss-Feig, Jessica Heacock, Kimberly B Schauder, Whitney A Loring, Baxter P Rogers, Jennifer R Pryweller, Cassandra R Newsom, Jurnell Cockhren, **Aize Cao**, Scott Bolton, 'Affective neural response to restricted interests in autism spectrum disorders', *Journal Child Psychol Psychiatry*, 2014, 7:55(2): 162-71
9. Evonne J. Charboneau, Mary S. Dietrich, S. Park, **Aize Cao**, Tristan J. Watkins, Jennifer U. Blackford, Margaret M. Benningfield, Peter R. Martin, Maciej S. Buchowski, Ronald L. Cowan, 'Cannabis cue-induced brain activation correlates with drug craving in limbic and visual salience regions: preliminary results', *Psychiatry Research: Neuroimaging*, 214(2): 122-131, 2013
10. Tristan J Watkins, Vidya Raj, Junghee Lee, Mary S Dietrich, **Aize Cao**, Jennifer U Blackford, Ronald M Salomon, Sohee Park, Margaret M Benningfield, Christina R Di Iorio, Ronald L Cowan, 'Human ecstasy (MDMA) polydrug users have altered brain activation during semantic processing', *Psychopharmacology (Berl)* 2013, 227(1): 41-54.
11. Laurie E. Cutting, Amy C. Stephens, K.R. Pugh, Scott Burns, **Aize Cao**, G.J.J. Pekar, Nicole Davis, and Shryl L. Rimrod, 'Not All Reading Disabilities are Dyslexia: Distinct Neurobiology of Specific Comprehension Deficits', *Brain Connectivity*, 3(2):199-211, 2013.
12. Carissa Cassio, Jennifer Foss Feig, Ronald Cowan, Margaret Benningfield, Baxter Rogers, **Aize Cao**, 'Response of neural reward regions to food cues in autism spectrum disorders', *Journal of Neurodevelopmental Disorders*, 4(1), 2012.
13. Christina R. Di Iorio, T.J. Watkins, Mary S. Dietrich, **Aize Cao**, Jennifer U. Blackford, Baxter Rogers, Mohammed S. Ansari, Ronald M. Baldwin, Rui Li, Robert M. Kessler, Ronald M. Salomon, Margaret Benningfield, Ronald Cowan, 'Evidence for Chronically altered serotonin function in the cerebral cortex of femal 3,4-Methylenedioxymethamphetamine polydrug users', *Archives of General Psychiatry*, 69(4): 399-409, 2012.

14. L. Bauernfeind, M.S Dietrich, J.Blackford, E. J. Charboneau, J. G. Lillevig, C.M.Cannistraci, N.D.Woodward, **Aize Cao**, Ronald L. Cowan, 'Human ecstasy use is associated with increased cortical excitability: an fMRI study', *Neuropsychopharmacology*, pp. 1127-1141, 2011.
15. P. Dumpuri, R. C. Thompson, **Aize Cao**, S. Ding, I. Garg, B. M. Dawant, M. I. Miga, 'A fast and efficient method to compensate for brain shift during surgery', *IEEE Trans. On Biomedical Engineering*, Vol.57, No.6, pp. 1285-1296, 2010.
16. X. L. Yang, Q. Song and **Aize Cao**, 'A novel pruning approach for robust data clustering', *Neural Computing and Applications*, Vol. 18, pp 759-768, 2009.
17. S. Ding, M. I. Miga, J. H. Noble, **Aize Cao**, P. Dumpuri, R. C. Thompson, B. M.Dawant, 'Semi-automatic registration of pre- and post-resection laser range scanner images', *IEEE Trans. On Biomedical Engineering (TBME)*, Vol. 56, pp 770-780, 2009.
18. **Aize Cao**, R. C. Thompson, P. Dumpuri, B. M. Dawant, S. Ding, and M. I. Miga, 'Laser range scanning for image-guided neurosurgery: Investigation of image-to-physical space registrations', *Medical Physics*, Vol. 35, No. 4, pp. 1593-1605, 2008.
19. **Aize Cao**, Q. Song, and X. L. Yang, 'Robust Information Clustering for Automatic Breast Mass Detection in Digitized Mammograms', *Computer Vision and Image Understanding*, Vol. 109, pp. 86-96, 2008.
20. XuLei Yang, Qing Song, Yue Wang, **Aize Cao**, Yi-Lei Wu, 'A Modified Deterministic Annealing Algorithm for Robust Image Segmentation', *Journal of Mathematical Imaging and Vision*. 01/2008; 30:308-324
21. P. Dumpuri, R. C. Thompson, B. M. Dawant, **Aize Cao**, M. I. Miga, 'An atlas-based method to compensate for brain shift: Preliminary results', *Medical Image Analysis*, Vol.11, No. 2, pp.128-145, 2007
22. X. L. Yang, **Aize Cao**, Q.Song, 'A New Cluster Validity for Data Clustering', *Neural Processing Letters*, , 2007

Published Abstracts and Presentations

1. **Aize Cao**, Liam Rose, Todd H. Wagner, Sharidan K. Parr, Kristine E. Lynch, Scott L. DuVall, Michael E. Matheny, 'Conversion of National Veteran Affairs Health Cost Data into the OMOP CDM: Preliminary Transformation', *OHDSI*, 2020
2. Kristin de Groot, **Aize Cao**, Qiuying Lucy Zhang, Denis M. Hynes, Donghui Kan, Amanda Talor, Linda Kok, Fern FitzHenry, Scott L. DuVall, Mari Souden, Michael Matheny, 'Transforming Medicare Research Identifiable Files (RIF) into the OMOP Common Data Model', *OHDSI*, 2018
3. **Aize Cao**, Margaret Gonsoulin, Kristin de Groot, Elizabeth Hanchrow, Daniel Park, Kristine Lynch, Denise Hynes, Scott L. DuVall, Michael E. Matheny, Stephen A. Deppen, 'Quality assurance of demographics consistency between Veterans Affairs and Medicare data', *OHDSI*, 2017
4. Jejo Koola, **Aize Cao**, G. Chen, Amy Perkins, Samuel B. Ho, Sharon Davis, Michael Matheny, 'Machine Learning Models to Predict Readmission for Patients with Cirrhosis', *AMIA*, 2017
5. Jejo Koola, G. Chen, Amy Perkins, **Aize Cao**, John Denver, Michael Matheny, Samuel B. Ho, 'Algorithm for identification of patients at high risk for cirrhosis from administrative data', *AASLD*, 2017
6. Jejo Koola, **Aize Cao**, Amy M. Perkins, Guanhua Chen, Samuel B. Ho, Michael E. Matheny, 'Post-discharge mortality in a national cohort of Veterans Affairs patients with cirrhosis', *American Association for the Study of Liver Disease*, Boston, 2016
7. Fern Fitzhenry, Svetlana K. Eden, Jason Denton, Robert J. LoCasale, Hui Cao, **Aize Cao**, Ruth Reeves, Nancy Wells, Michael Matheny, 'Informatics challenges in working with "big data" – a use case in identifying predictors of constipation', *AMIA*, Pittsburgh, 2016
8. **A. Cao**, M. I. Miga, P. Dumpuri, S. Ding, B. M. Dawant, R. C. Thompson, 'Target error for image-to-physical space registration: Preliminary clinical results using laser range scanning', *Medical Imaging 2007: Visualization and Image-Guided Procedures: Proc. of SPIE*, 2007
9. **A. Cao**, P. Dumpuri, and M. I. Miga, 'Tracking cortical surface deformations based on vessel structure using a laser range scanner', *International Symposium on Biomedical Imaging*, 2006

10. XuLei Yang, **Aize Cao**, Qing Song: Image Segmentation by Deterministic Annealing Algorithm with Adaptive Spatial Constraints. *ISNN (2)* 2006: 504-510
11. XuLei Yang, Qing Song, **Aize Cao**, Sheng Liu, Chengyi Guo: Robust c-shells based deterministic annealing clustering algorithm. *FUZZ-IEEE* 2004: 1413-1417
12. **Aize Cao**, Qing Song, XuLei Yang, Lei Wang: Breast Mass Segmentation based on Information Theory. *ICPR (3)* 2004: 758-761
13. **Aize Cao**, Qing Song, XuLei Yang, Sheng Liu: Breast Mass Segmentation on Digital mammograms by a Combined Deterministic Annealing Method. *ISBI* 2004: 1303-1306

Oral Presentations

Target error for image-to-physical space registration: Preliminary clinical results using laser range scanning', *SPIE*

2007

Poster Presentations

Conversion of National Veteran Affairs Health Cost Data into the OMOP CDM: Preliminary Transformation, OHDSI

2020

Quality assurance of demographics consistency between Veterans Affairs and Medicare data, OHDSI

2017

Breast Mass Segmentation on Digital Mammograms by a Combined Deterministic Annealing Method, ISBI

2004

Professional Community Activities

Reviewer for Applied Clinical Informatics

2019-2020

Reviewer for Journal of Biomedical and Health Informatics

2016

Reviewer for IEEE Transaction on Medical Imaging

2007-2008

Reviewer for IEEE Transaction on Biomedical Engineering

2005-2006