Ling Tong

University of Wisconsin Milwaukee (BioDLP Lab) (Ling's Website)
Department of Health Informatics & Administration, College of Health Sciences
414-210-0771, ltong@uwm.edu

SUMMARY

I'm a PhD candidate focusing on clinical informatics and artificial intelligence. I co-authored over 20 publications in biomedical informatics and computer science journals, such as *Journal of Biomedical Informatics*, *JMIR AI*, and *Applied Clinical Informatics*. I have also been a reviewer for informatics journals, including *IEEE Journal of Biomedical and Health Informatics*, and *Journal of Medical Internet Research(JMIR)*. I'm an active member of the American Medical Informatics Association (AMIA), and served as a reviewer for AMIA's conference proceedings.

I have been working under the research studies funded by National Institute of Health (NIH), National Natural Science Foundation of China (NSFC), and Advancing a Healthier Wisconsin Endowment. For health care population studies, I conduct research using electronic health records from Medical College of Wiconsin and Froedtert Hospital. I developed quantitative analysis to identify health inequities of telemedicine in the context of COVID-19 pandemic. In 2021, my paper *Telemedicine Adoption during the COVID-19 Pandemic: Gaps and Inequalities* was among the top 10% cited paper of Applied Clinical Informatics Journal. I'm also specialized in AI. My research objective is to leverage Electronic Health Record data to improve machine learning model's transparency. My recent study evaluated the feasibility of AI-based health news evaluation system.

Since 2019, I've been teaching a healthcare computational tools course. I support modern technologies like remote learning, video learning, and interactive environments. I encourage students to take on challenges and to be lifelong learners. I've been teaching for over 4 years.

ACADEMIC BACKGROUND

Ph.D. Biomedical and Health Informatics   2022
University of Wisconsin Milwaukee, Milwaukee, WI
- Biomedical informatics research under the direction of Jake Luo.
- Dissertation: Transforming Electronic Health Records for Machine Learning Diagnostic Model

B.S. Computer Science   2017
University of South China, Hunan Province, P.R. China
- Extensive training in programming and software engineering projects.
- Thesis: Classifying Weibo Tweets for Tracking Influenza

AWARDS AND FELLOWSHIP

Team member, Clinical & Translational Science Award, by NIH 2020 - 2022

- The Medical College of Wisconsin (MCW) has been awarded a 5-year, $24.4M Clinical and Translational Science Award(CTSA). See news here.
- The CTSA Program is designed to develop innovative solutions that will improve the efficiency, quality and impact of the process for turning observations in the laboratory, clinic and community into interventions that improve the health of individuals and the public.
- I contributed over 10 papers through the project, which was supported by the National Center for Advancing Translational Sciences from NIH.

Team member, OTO Clinomics, Advancing a Healthier Wisconsin Endowment, Supported by NIH 2020 - 2022

- OTO Clinomics is a interdisciplinary hub in MCW focused on population health, biostatistics, bioethics and epidemiology research. OTO Clinomics support missions of providing the best healthcare possible by striving for excellence, measuring our outcomes, searching for knowledge, and educating next generation of medical providers.
- OTO Clinomics is funded through the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin with support by the National Center for Advancing Translational Sciences, National Institutes of Health. OTO Clinomics published over 30 papers during the year of 2022. Read reports here.
- Our lab established a partnership with OTO Clinomics. I conduct outcome search, data analysis, visualization, and interpretations to contribute clinical informatics projects to this endowment.

Team member, Young Scientists Fund of the National Natural Science Foundation of China 2016 - 2018

- Lingyun Luo's receieved the grant (CN ¥210,000) for the project of *Quality Assessment of Large Medical Ontology* in 2016.
- I contributed study insights to this project. I work in Dr Luo's lab and completed a paper published in *Journal of Biomedical Informatics*.

Chancellor's Graduate Student Awards 2017 - 2019

- In 2017, I was awarded $16,000 for Chancellor's Graduate Student Awards by University of Wisconsin Milwaukee through a extremely competitive process and selection.

Undergraduate Student Research and Innovative Project 2016 - 2017

- In 2016, I was awarded CN ¥10,000 by University of South China for a Undergraduate Student Research and Innovative Project.

| **TEACHING EXPERIENCE** | *Instructor* | 2019 - 2022 |

TEACHING EXPERIENCE

Instructor   2019 - 2022
(U) Computational Tools for Healthcare Professionals

- This lecture focuses on healthcare introduction of computational tools for information management.
- A undergraduate course focus on system architecture, process, and ethical concepts.
- Incorporates training in Microsoft Excel application software.
- We adopted a hybrid teaching in a mix of online and in-person format since 2020.

Teaching Assistant   2018 (Fall)
(U/G) Health Information Technology & Management. Instructor: Min Wu

- A undergraduate/graduate hybrid course focus on Introduction to origins, sources and content of healthcare data.
- This course also introduces technologies used to manage and control healthcare databases, such as SQL and relational database.
- Introduction to key components of healthcare databases, telecommunications technology, electronic medical record (EMR), project management, and systems evaluation.

Teaching Assistant   2018 (Spring)
(G) Health Big Data Processing Platforms. Instructor: Jake Luo

- Study of big data processing techniques in healthcare.
- Data analysis platform of Apache Spark.
- Responsibility: Grading Homework, in-class programming help, providing email support.

RESEARCH EXPERIENCE

Research Assistant   2017 - Present
University of Wisconsin Milwaukee, BioDLP Lab, Milwaukee, WI

- Conduct exploratory and predictive analysis on health informatic topics.
- Machine Learning, Deep Learning, Data Mining, Language Processing, and Knowledge representation.
- Create statistical and computer-based methodologies for translational research.
- Identify social and diagnostic gaps in populations using Electronic Health Records.
- Collaborate with Medical College of Wisconsin clinicians to identify social determinants of clinical conditions.
- Deliver presentations, talks, and workshops on a variety of clinical and computer science topics at conferences.

Research Assistant   2015 - 2017
University of South China, PI: Lingyun Luo, Hunan, P.R. China

- Research: Quality Improvement of Biomedical Terminologies
- We created methodologies for detecting inconsistencies in large biomedical ontologies.
- Over 3000 misalignments, imbalances, and missing concepts are detected, identified, and corrected.
- Publication: Evaluating the granularity balance of hierarchical relationships within large biomedical terminologies towards quality improvement on Journal of biomedical informatics

PUBLICATIONS   *Journal Articles*

- **Tong, Ling**, Khani, Masoud, Lu, Qiang and Taylor, Bradley, Osinski, Kristen, Luo, Jake. Association between Body-Mass Index, Patient Characteristics, and Obesity-related Comorbidities among COVID-19 Patients: A Prospective Cohort Study. Obesity Research and Clinical informatics. 2022.
- Liu X, Alsghaier H, **Tong L**, Ataullah A, Mcroy S. Visualizing Interpretation of a Criteria-Driven System that Automatically Evaluates Quality of Health News: An Exploratory Study of Two Approaches. JMIR AI
- **Tong L**, George B, Crotty B, Melek S, Taylor B, Osinski K, Luo J. Telemedicine and Health Disparities: Association between Patient Characteristics and Telemedicine, In-person, Telephone and message-based Care During the COVID-19 Pandemic. Ipem-translation. 2022.
- Luo, J., **Tong, L.**, Crotty, B. H., Somai, M., Taylor, B., Osinski, K., & George, B. (2021). Telemedicine Adoption during COVID-19 Pandemic: Gaps and Inequalities. Applied Clinical Informatics.
- Luo, L., **Tong, L.**, Zhou, X., Mejino Jr, J. L., & Liu, Y. (2017). Evaluating the granularity balance of hierarchical relationships within large biomedical terminologies towards quality improvement. Journal of Biomedical Informatics, 75, 129-137
- Anisuzzaman, D. M., Barzekar, H., **Tong, L.**, Luo, J., & Yu, Z. (2021). A deep learning study on osteosarcoma detection from histological images. Biomedical Signal Processing and Control, 69, 102931
- Thomas, A., Flanary, V., Friedland, D. R., Adams, J. A., **Tong, L.**, Osinski, K., Luo, J. (2021). The impact of social determinants of health and clinical comorbidities on post-tympanotomy tube otorrhea. International Journal of Pediatric Otorhinolaryngology, 110986.
- Shane W. White, Jonathan M. Bock, Joel H. Blumin, David R. Friedland, Jazzmyne A. Adams, **Ling Tong**, Kristen Osinski, Jake Luo. (2021). Analysis of socioeconomic factors in laryngology clinic utilization for treatment of dysphonia, Laryngoscope Investigative Otolaryngology

- Poetker, D. M., Friedland, D. R., Adams, J. A., **Tong, L.**, Osinski, K., & Luo, J. (2021). Socioeconomic Determinants of Tertiary Rhinology Care Utilization. OTO open, 5(2), 2473974X211009830.

- Harvey, E., Stark, K., Friedland, D. R., Adams, J. A., Harris, M. S., **Tong, L.**, & Luo, J. Impact of Demographics and Clinical Features on Initial Treatment Pathway for Vestibular Schwannoma. Otology and Neurotology, 10-1097.

- M, Patel., J, Bock., J, Blumin., D, Friedland., A, Jazzmyne., **Tong, L.**, K, Osinski., J, Luo, Demographic Differences in the Treatment of Unilateral Vocal Fold Paralysis, Laryngoscope Investigative Otolaryngology, 2022.

- Xiao Ye, **Ling Tong**, *(in Chinese)* Construction and Application of Chinese-English Bilingual Corpus for Traditional Chinese Medicine Terminologies. Modern Linguistics. 2019 Vol. l7, No. 2.

- Xie Jian, Xiaoxi Zhou, **Ling Tong**, Lingyun Luo, *(in Chinese)* Data mining technology of electronic medical records based on Chinese word segmentation, Journal of Hunan University of Science and Technology, 2016.

Conferences
- (Accepted) **Ling Tong**, Masoud Khani, Jake Luo, A Visualization Model for Diagnosing Diabetic Retinopathy Severity and Discovering Plaque Patterns in Retinal Images, Tong, Ling, Khani, Masoud, and Luo, Jake, AI in Aging and Age-related Diseases Conference, 2022.

- **Tong, L.**, Luo, J., Cisler, R., & Cantor, M. (2019, July). Machine learning-based modeling of big clinical trials data for adverse outcome prediction: A case study of death events. In 2019 IEEE 43rd Annual Computer Software and Applications Conference (COMPSAC) (Vol. 2, pp. 269-274). IEEE.

- **Tong, L.**, Luo, J., Adams, J., Osinski, K., Liu, X., & Friedland, D. (2022, June). A Clustering-Aided Approach for Diagnosis Prediction: A Case Study of Elderly Fall. In 2022 IEEE 46th Annual Computers, Software, and Applications Conference (COMPSAC) (pp. 337-342). IEEE.

- Hernandez, L., **Tong, L.**, Cofino, J., Johannessen, J. O., Guda, N. M., Muddana, V., & Luo, J. (2020). Tu1058 Association Between Attending Endoscopists' experience And Complication Rates For All Endoscopic Procedures: A 10-Year Longitudinal Study. Gastrointestinal Endoscopy, 91(6), Ab525.

- **Tong, L.**, Hernandez, L. V., & Luo, J. (2020). 41 Predicting Gastrointestinal (Gi) Hemorrhage Using A Machine Learning Approach: Risk Factors And Predictive Analysis In Clinical Studies. Gastroenterology, 158(6), S-16.

- **Ling Tong**, Lyndon V. Hernandez, Julia Cofino, Jack O. Johannessen, Nalini M. Guda, Jake Luo, Tu1981 Association Modeling Between Pa-

tients' Age And Complication Rate For Endoscopic Procedures, Gastroenterology, 2020.

- **Ling Tong**, Xin Zhao, Lingyun Luo, The relationship between influenza cases and air quality index based on correlation analysis. The 23rd National Medical Informatics Conference of the Chinese Medical Association.

In Revision

- (In Minor Revision) **Ling Tong**, Jake Luo, Jazzmyne Adams, Kristen Osinski, Xiaoyu Liu, David Friedland, Interpretable Machine Learning Text Classification for Computed Tomography Reports – A Case Study of Temporal Bone Fracture. Computer Methods and Programs in Biomedicine Update.

INVITED PRESENTATIONS

- **Ling Tong**, Jake Luo, Jazzmyne adams, Kristen Osinski, Xiaoyu Liu, David Friedland, A Clustering-Aided Approach for Diagnosis Prediction: A Case Study of Elderly Fall. 2022 IEEE 46th Annual Computers, Software, and Applications Conferences.

- **Ling Tong**, Predicting the Clinical Outcomes from Clinical Trial Data using Machine Learning, presenting at 2019 Health Research Symposium at University of Wisconsin Milwaukee.

- **Ling Tong**, Jake Luo, Ron Cisler, Michael N. Cantor, Machine Learning-based Prediction of Death Events in Clinical Studies Using Big Clinical Trial Data, In 2019 IEEE 43rd Annual Computer Software and Applications Conference.

- **Ling Tong**, Jake Luo, From Phone to Medical Database: An Automatic Document Processing System for Clinical Laboratory Test, Presenting at 2019 Research Poster Competition, University of Wisconsin Milwaukee.

- Neil K. Osafo, BS; David R. Friedland, MD, PhD; Michael S. Harris, MD; Jazzmyne Adams, MPH; Chasity Davis; **Ling Tong**; Jake Luo, PhD, Standardization of Outcome Measures for Intratympanic Steroid Treatment for Idiopathic Sudden Sensorineural Hearing Loss, Combined Otolaryngology Specialties Meeting, Dallas, TX,

- Erin Harvey, MD; Katarina Stark, BS; David R. Friedland, MD, PhD; Jazzmyne A. Adams, Michael S. Harris, MD, **Ling Tong**, Jake Luo PhD, Impact of Demographics and Clinical Features on Initial Treatment Decision Making in Vestibular Schwannoma, 57th Annual Ans Spring Meeting, Dallas, TX,

- **Ling Tong**, Jake Luo, Ron Cisler, Michael N. Cantor, Machine Learning-based Prediction of Death Events in Clinical Studies Using Big Clinical Trial Data, 2018 Health Research Symposium University of Wisconsin Milwaukee.

PROFESSIONAL ACTIVITIES

Scholarly Reviews   2019 - 2022

- Applied Clinical Informatics
- American Medical Informatics Association, 2022 Symposium
- Biomedical Signal Processing and Control
- Computers in Biology and Medicine
- Health Informatics Journal
- IEEE Journal of Biomedical and Health Informatics
- Journal of Medical Internet Research (JMIR)
- JMIR Public Health and Surveillance

Professional Memberships   2019 - 2022

- American Medical Informatics Association (AMIA)
- American Heart Association, Basic Life Support Provider
- IEEE Computer Society

WORK EXPERIENCE

Data Analysis Engineer   2020
Lubar School of Business, UWM. PI: Purush Papatla

- I worked part-time on data analysis, visualizations, and development of predictive model for DNC project - A Big Data Lens on the Elections.
- We tracked the major issues engaging both candidates and voters in the 2020 US election cycle. We applied a social curation technique to multiple sources of data ranging from traditional political polls and debate transcripts to political advertising and social media dialogue.

LANGUAGES

- English: Full Professional Proficiency.
- Chinese: Native Proficiency.

REFERENCES

Jake Luo, PhD
- Associate Professor, Director of Health Care Informatics
- University of Wisconsin Milwaukee
- jakeluo@uwm.edu

Mor Peleg, PhD
- Editor-in-Chief, Journal of Biomedical Informatics
- Professor, University of Haifa, Haifa, Israel
- morpeleg@is.haifa.ac.il

Timothy Haas, PhD
- Associate Professor, Lubar College of Business
- University of Wisconsin Milwaukee
- haas@uwm.edu

Susan Mcroy, PhD
- Professor, College of Engineering and Applied Science
- University of Wisconsin Milwaukee
- mcroy@uwm.edu

Steve Castelaz, MBA
- Adjunct professor, lecturer, College of Health Sciences
- University of Wisconsin Milwaukee
- castelaz@uwm.edu

Lingyun Luo, PhD
- Associate professor in Computer Science
- University of South China
- luoly@usc.edu.cn