Dennis L. Shung, M.D. M.H.S. Ph.D.
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EDUCATION

Rice University, Houston, TX
Bachelor of Science in Biochemistry & Cell Biology, *cum laude*
Bachelor of Arts in Hispanic Studies, *cum laude*
2006-2010

Baylor College of Medicine, Houston, TX
Doctor of Medicine
2010-2014

Yale School of Medicine, New Haven, CT
Master of Health Science, Clinical Informatics
2018-2020

Yale Graduate School of Arts and Sciences, New Haven, CT
PhD, Investigative Medicine
2020-2022

POSTDOCTORAL TRAINING

Yale-New Haven Hospital, New Haven, CT
Traditional Internal Medicine Residency Program
2014-2017

Yale-New Haven Hospital, New Haven, CT
Gastroenterology & Hepatology Fellowship Program
2017-2020

ACADEMIC APPOINTMENTS

07/2020 – 05/2021	Instructor in Medicine, Yale School of Medicine, New Haven CT
07/2021 – 07/2022	Associate Research Scientist, Yale School of Medicine, New Haven CT
07/2021 – 07/2025	Director of Digital Health, Yale School of Medicine, New Haven CT
07/2022 – 07/2025	Assistant Professor of Medicine, Yale School of Medicine, New Haven CT
	Primary: Section of Digestive Diseases, Department of Medicine
	Secondary: Department of Biomedical Informatics and Data Science
10/2023 – 07/2025	Director of Applied Artificial Intelligence
	Yale Center for Healthcare Simulation, New Haven, CT
09/2025 – present	Director of Clinical Generative Artificial Intelligence and Innovation
	Mayo Clinic, Rochester, MN
09/2025 – present	Senior Associate Consultant
	Mayo Clinic, Rochester, MN
02/2026 –	Associate Professor of Medicine
	Mayo Clinic, Rochester, MN
02/2022 – present	Honorary Visiting Scientist
	Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore

HONORS AND AWARDS

2025	Young Physician-Scientist Early-Career Award, American Society for Clinical Investigation
2022	Iva Dostanic Award, Yale Department of Medicine
2022	Samuel Kushlan Junior Faculty Award for Excellence in Clinical Research, Yale School of Medicine
2021	Research Scholar Award, American Gastroenterological Association
2020	Samuel Kushlan Award for Excellence in Research, Yale School of Medicine
2020	Tech Summit Faculty, 11th Annual Technology Summit, American Gastroenterological Association and the Center for GI Innovation and Technology
2019	Epic Systems Advanced Physician Builder Certification
2019	Certificate of Recognition as an Early Career Investigator, AGA DDW 2019

2014	The Gold Humanism Honor Society
2014	Harris Health Profile in Innovation Award (harrishealthrx.com)
2013	Finalist, David Calkins Memorial Scholarship: Institute for Healthcare Improvement
2011	The Albert Schweitzer Fellowship

RESEARCH FUNDING

Agency: NIH/NIDDK
I.D.# K23 DK125718
Title: Deep Learning Approaches to Risk Stratification in Acute Gastrointestinal Bleeding
PI: Dennis L. Shung
Award Amount: $969,300
Project Period: 09/01/2021-08/31/2026

Agency: Yale Cancer Center & Center for Gastrointestinal Cancers at Smilow Cancer Hospital (YCC-CGIC)
Title: Multimodal Language-Augmented Foundation Vision Model to Personalize Care for Pancreatic Cysts
PI: Dennis L. Shung (Co-PI)
Award Amount: $50,000
Project Period: 9/1/2024-8/31/2025

Agency: American Gastroenterological Association Research Institute
ID: AGA202022-21-01
Title: AGA-Medtronic Pilot Research Award in Artificial Intelligence
PI: Dennis L. Shung
Award Amount: $30,000
Project period: 4/1/2022-3/31/2023

BOARD CERTIFICATION

2017	Internal Medicine, American Board of Internal Medicine
2022	Clinical Informatics, American Board of Preventative Medicine
2023	Gastroenterology and Hepatology, American Board of Internal Medicine

EDITORIAL AND PEER REVIEW

2023-	Associate Editor, Gastroenterology
2025-	Reviewer, SBIR/STTR for National Institute of Diabetes and Digestive and Kidney Diseases
2025-	Reviewer, Nature Gastroenterology and Hepatology
2025-	Reviewer, New England Journal of Medicine
2025-	Reviewer, New England Journal of Medicine AI
2025-	Reviewer, Neural Information Processing Systems
2025-	Reviewer, IEEE Transactions on Human-Machine Systems
2024	Study Section Reviewer, FDT-BioTech Panel, National Science Foundation
2024	Reviewer, Swiss National Science Foundation (SNSF)
2024	Reviewer, Region Syddanmark University of Southern Denmark and Odense University Hospital
2021-	International Editorial Board, Alimentary Pharmacology and Therapeutics
2020-2024	Editorial Board, Inflammatory Bowel Diseases Journal
2022-2023	Editorial Board, GastroHep Advances
2019-	Reviewer, Nature Scientific Reports
2019-	Reviewer, JAMA Network Open
2019-	Reviewer, Clinical and Translational Gastroenterology
2019-	Reviewer, Clinical Gastroenterology and Hepatology
2018-	Reviewer, Alimentary Pharmacology and Therapeutics

CONTRIBUTIONS TO SCIENCE

- My publications establish the performance of machine learning approaches to identify very-low-risk patients with

acute upper gastrointestinal bleeding, who can be discharged from the emergency department for outpatient management. This has been recommended by national and international guidelines for acute upper gastrointestinal bleeding, but awareness and use of risk stratification tools have been poor. These publications provide evidence that machine learning models outperform existing clinical risk scores at initial risk assessment and in tracking dynamic risk over time. I also estimate potential cost savings to the United States health system with consistent application of machine learning risk stratification. By providing evidence of machine learning models to perform well in predicting patient risk, this body of work has demonstrated the feasibility of machine

learning models to provide reliable and accurate risk stratification for patients with acute gastrointestinal bleeding. I served as the primary investigator in all these studies.

    a. **Shung DL**, Chan CE, You K, Nakamura S, Saarinen T, Zheng NS, Simonov M, Li DK, Tsay C, Kawamura Y, Shen M, Hsiao A, Sekhon JS, Laine L. Validation of an Electronic Health Record-Based Machine Learning Model Compared With Clinical Risk Scores for Gastrointestinal Bleeding. Gastroenterology. 2024 Jul 5:S0016-5085(24)05183-7. PMID: 38971198

    b. **Shung DL**, Au B, Taylor RA, Tay JK, Laursen SB, Stanley AJ, Dalton HR, Ngu J, Schultz M, Laine L, Validation of a Machine Learning Model That Outperforms Clinical Risk Scoring Systems for Upper Gastrointestinal Bleeding. Gastroenterology 2020 Jan;158(1):160-167. PMID: 31562847

    c. **Shung DL,** Huang J, Castro E, Tay JK, Simonov M, Laine L, Batra R, Krishnaswamy S. Neural network predicts need for red blood cell transfusion for patients with acute gastrointestinal bleeding admitted to the intensive care unit. Sci Rep. 2021 Apr 23;11(1):8827. PMID: 33893364

    d. Zhang X*, Pu Y*, Kawamura Y, Loza A, Bengio Y, Tong A**, **Shung DL****. Trajectory Flow Matching with Applications to Clinical Time Series Modelling. Advances in Neural Information Processing Systems (NeurIPS) 2024. **Spotlight Presentation (Top 3%)**

    e. **Shung DL**, Lin JK, Laine L. Achieving Value by Risk Stratification With Machine Learning Model or Clinical Risk Score in Acute Upper Gastrointestinal Bleeding: A Cost Minimization Analysis. Am J Gastroenterol. 2024 Feb 1;119(2):371-373. PMID: 37753930

- In addition to the contributions described above, I also pave the way for implementation of machine learning models for clinical decision support with generative AI powered also by large language model-based electronic health record phenotypes to automatically identify patients with signs or symptoms of acute gastrointestinal bleeding. This body of work provides the necessary information to inform algorithmic stewardship of machine learning models for acute gastrointestinal bleeding, with best practices for large language model configuration.

    a. Zheng NS, Keloth VK, You K, Kats D, Li DK, Deshpande O, Sachar H, Xu H, Laine L, **Shung DL**. Detection of Gastrointestinal Bleeding with Large Language Models to Aid Quality Improvement and Appropriate Reimbursement. Gastroenterology. 2024 Sep 18:S0016-5085(24)05467-2. PMID: 39304088

    b. **Shung DL,** Tsay C, Laine L, Chang D, Li F, Thomas P, Partridge C, Simonov M, Hsiao A, Tay JK, Taylor A. Early identification of patients with acute gastrointestinal bleeding using natural language processing and decision rules. J Gastroenterol Hepatol. 2021 Jun;36(6):1590-1597. PMID: 33105045

    c. Giuffrè M*, You K*, Pang Z*, Kresevic S, Chung S, Chen R, Ko Y, Chan C, Saarinen T, Ajcevic M, Crocè LS, Garcia-Tsao G, Gralnek I, Sung JJY, Barkun A, Laine L, Sekhon J, Stadie B**, **Shung DL****. Expert of Experts Verification and Alignment (EVAL) Framework for large language models safety in gastroenterology. npj Digit. Med. 2025 May;8,242. https://doi.org/10.1038/s41746-025-01589-z

    d. Chung S, Giuffrè M, Rajashekar N, Pu Y, Shin YE, Kresevic S, Chan C, Nakamura-Sakai S, You K, Saarinen T, Hsiao A, Wong AH, Evans L, McCall T, Kizilcec RF, Sekhon J**, Laine L**, **Shung DL****. Usability and adoption in a randomized trial of GutGPT a GenAI tool for gastrointestinal bleeding. npj Digit Med. 2025 Aug 18;8(1):527. doi: 10.1038/s41746-025-01896-5. PMID: 40825997; PMCID: PMC12361555.

- Future risk stratification will require human-artificial intelligence teaming and interaction, possibly with the use of large language models. Novel algorithmic frameworks to quantify human expertise is necessary to optimally enhance the integration of artificial intelligence decision support systems into clinical care. Synthetic data approaches may also play a role in testing different algorithmic approaches. I explore algorithmic approaches to identify optimal configurations of AI in clinical decision support for risk stratification for human-AI clinical teams.

    a. Alur R, Laine L, Li D, Raghavan M, Shah D, **Shung DL**. Auditing for Human Expertise. Advances in Neural Information Processing Systems 36 (NeurIPS 2023). **Spotlight Presentation (Top 3%)** https://proceedings.neurips.cc/paper_files/paper/2023

    b. Nakamura-Sakai S., **Shung DL****, Jasjeet Sekhon** Enhancing Collaborative Medical Outcomes through Private Synthetic Hypercube Augmentation: PriSHA. Proceedings of the fifth Conference on Health, Inference, and Learning, PMLR 248:55-71. https://proceedings.mlr.press/v248/

    c. Kresevic S, Giuffrè M, Ajcevic M, Accardo A, Crocè L, **Shung DL**. Optimization of hepatological clinical guidelines interpretation by large language models: a retrieval augmented generation-based framework. npj Digit. Med. 7, 102 (2024). PMID: 38654102

    d. Rajashekar NC*, Shin Y*, Pu Y*, Chung S, You K, Giuffre M, Chan C, Saarinen T, Hsiao A, Sekhon J, Wong A, Evans L, Kizilcec R, Laine L, McCall T, **Shung DL.** 2024. Human-Algorithmic Interaction Using a Large Language Model-Augmented Artificial Intelligence Clinical Decision Support System. In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24). Association for Computing Machinery. DOI: https://doi.org/10.1145/3613904.3642024

PUBLICATIONS *first authors **senior authors

1. Soroush A, Giuffrè M, Chung S, **Shung DL**. Generative Artificial Intelligence in Clinical Medicine and Impact on Gastroenterology. Gastroenterology. 2025 Aug;169(3):502-517.e1. doi: 10.1053/j.gastro.2025.03.038. Epub 2025 Apr 15. PMID: 40245953.

2. Caminero A, Tropini C, Valles-Colomer M, **Shung DL**, Gibbons SM, Surette MG, Sokol H, Tomeo NJ; Scientific Advisory Board of the Center for Gut Microbiome Research and Education of the American Gastroenterological Association; Tarr PI, Verdu EF. Credible inferences in microbiome research: ensuring rigour, reproducibility and relevance in the era of AI. Nat Rev Gastroenterol Hepatol. 2025 Jul 31. doi: 10.1038/s41575-025-01100-9. Epub ahead of print. PMID: 40745489.

3. Chung S, Giuffrè M, Rajashekar N, Pu Y, Shin YE, Kresevic S, Chan C, Nakamura-Sakai S, You K, Saarinen T, Hsiao A, Wong AH, Evans L, McCall T, Kizilcec RF, Sekhon J**, Laine L**, **Shung DL****. Usability and adoption in a randomized trial of GutGPT a GenAI tool for gastrointestinal bleeding. npj Digit Med. 2025 Aug 18;8(1):527. doi: 10.1038/s41746-025-01896-5. PMID: 40825997; PMCID: PMC12361555.

4. Chung S, Saberzadeh-Ardestani B, Nigam G, Yuan Y, Singh S, **Shung D**. Large Language Model-Supported Systematic Reviews to Augment Clinical Guideline Development: An American Gastroenterological Association Pilot. Gastroenterology. 2025 Sep;169(4):715-717. doi: 10.1053/j.gastro.2025.03.034. Epub 2025 Apr 6. PMID: 40199387; PMCID: PMC12354060.

5. Giuffrè M*, You K*, Pang Z*, Kresevic S, Chung S, Chen R, Ko Y, Chan C, Saarinen T, Ajcevic M, Crocè LS, Garcia-Tsao G, Gralnek I, Sung JJY, Barkun A, Laine L, Sekhon J, Stadie B**, **Shung DL****. Expert of Experts Verification and Alignment (EVAL) Framework for large language models safety in gastroenterology. npj Digit. Med. 2025 May;8,242. https://doi.org/10.1038/s41746-025-01589-z

6. Sultan S*, **Shung DL***, Kolb JM, Foroutan F, Hassan C, Kahi CJ, Liang PS, Levin TR, Siddique SM, Lebwohl B. AGA Living Clinical Practice Guideline on Computer-Aided Detection-Assisted Colonoscopy. Gastroenterology. 2025 Apr;168(4):691-700. doi: 10.1053/j.gastro.2025.01.002.

7. Foroutan F, Vandvik PO, Helsingen LM, Kalager M, Rutter M, Selby K, Pilonis ND, Anderson JC, McKinnon A, Fuchs JM, Quinlan C, Buskermolen M, Senore C, Wang P, Sung JJY, Haug U, Bjerkelund S, Triantafyllou K, **Shung DL**, Halvorsen N, McGinn T, Hafver TL, Reinthaler V, Guyatt G, Agoritsas T, Sultan S. Computer aided detection and diagnosis of polyps in adult patients undergoing colonoscopy: a living clinical practice guideline. BMJ. 2025 Mar 27;388:e082656.

8. Soleymanjahi S, Rajashekar N, Chung S, Grimshaw AA, Tvedt MJK, Foroutan F, Sultan S, **Shung DL****, Kolb JM**. Provider Attitudes and Perceptions on Using Artificial Intelligence in Colonoscopy: A Systematic Review and Meta-Analysis. Gastro Hep Advances 2025;4(20).

9. Geathers J, Hicke Y, Kongsonthana N, Sewell J, Jack AG, **Shung DL**, Preson M, Cornes S, Kizilcec RF. What Medical Students Need from Simulation: Insights to Guide Scalable Learning Design. Proceedings of the Twelfth ACM Conference on Learning@Scale. 2025. 351-355. https://doi.org/10.1145/3698205.3733954

10. Geathers, J, Hicke Y, Chan C, Rajashekar N, Young S, Sewell J, Cornes S, Kizilcec RF, **Shung D**. Benchmarking Generative AI for Scoring Medical Student Interviews in Objective Structured Clinical Examinations (OSCEs). In: Cristea, A.I., Walker, E., Lu, Y., Santos, O.C., Isotani, S. (eds) Artificial Intelligence in Education. AIED 2025. Lecture Notes in Computer Science(), vol 15879. Springer, Cham. https://doi.org/10.1007/978-3-031-98420-4_17

11. Xie Q, Chen Q, Chen A, Peng C, Hu Y, Lin F, Peng X, Huang J, Zhang J, Keloth V, Zhou X, Qian L, He H, **Shung D**, Ohno-Machado L, Wu Y, Xu H, Bian J. Medical foundation large language models for comprehensive text analysis and beyond. npj Digit. Med. 8, 141 (2025). https://doi.org/10.1038/s41746-025-01533-1

12. Soleymanjahi S, Huebner J, Elmansy L, Rajashekar N, Ludtke N, Paracha R, Thompson R, Grimshaw A,

Foroutan F, Sultan S, **Shung DL.** Artificial Intelligence–Assisted Colonoscopy for Polyp Detection: A Systematic Review and Meta-analysis. Ann Intern Med. Epub 22 October 2024. doi:10.7326/ANNALS-24-00981

13. Zheng NS, Keloth VK, You K, Kats D, Li DK, Deshpande O, Sachar H, Xu H, Laine L, **Shung DL**. Detection of Gastrointestinal Bleeding with Large Language Models to Aid Quality Improvement and Appropriate Reimbursement. Gastroenterology. 2024 Sep 18:S0016-5085(24)05467-2

14. **Shung DL**, Chan CE, You K, Nakamura S, Saarinen T, Zheng NS, Simonov M, Li DK, Tsay C, Kawamura Y, Shen M, Hsiao A, Sekhon JS**, Laine L**. Validation of an Electronic Health Record-Based Machine Learning Model Compared With Clinical Risk Scores for Gastrointestinal Bleeding. Gastroenterology. 2024 Jul 5:S0016-5085(24)05183-7

15. Rajashekar NC*, Shin Y*, Pu Y*, Chung S, You K, Giuffre M, Chan C, Saarinen T, Hsiao A, Sekhon J, Wong A, Evans L, Kizilcec R, Laine L, McCall T, **Shung DL**. 2024. Human-Algorithmic Interaction Using a Large Language Model-Augmented Artificial Intelligence Clinical Decision Support System. In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24). Association for Computing Machinery. DOI: https://doi.org/10.1145/3613904.3642024

16. Silverman AL, **Shung DL**, Stidham RW, Kochhar GS, Iacucci M. How Artificial Intelligence Will Transform Clinical Care, Research, and Trials for Inflammatory Bowel Disease. Clin Gastroenterol Hepatol. 2024 Jul 9:S1542- 3565(24)00598-6.

17. Burton SJ, **Shung DL**, Chung S, Aslanian H. Patient Perspective of Use of Artificial Intelligence During Colonoscopy. Gastro Hep Advances, 2024.

18. **Shung DL**, Li D, You K, Hung K, Laine L, Hughes M. Adoption of a Gastroenterology Hospitalist Model and the Impact on Inpatient Endoscopic Practice Volume: A Controlled Interrupted Time-Series Analysis. iGIE. Vol. 3 (2) 2024: 329-332.

19. Sehgal K, **Shung DL**. Editorial: Incidence and predictors of major gastrointestinal bleeding in patients on aspirin, low-dose rivaroxaban or the combination: Secondary analysis of the COMPASS randomised controlled trial. Aliment Pharmacol Ther. 2024 Sep 2.

20. Giuffrè M, Kresevic S, Pugliese N, You K, **Shung DL.** Optimizing large language models in digestive disease: strategies and challenges to improve clinical outcomes. Liver Int. 2024 Sep;44(9):2114-2124. doi: 10.1111/liv.15974.

21. Giuffrè M, Kresevic S, You K, Dupont J, Huebner J, Grimshaw AA, **Shung DL**. Systematic review: The use of large language models as medical chatbots in digestive diseases. Aliment Pharmacol Ther. 2024 Jul;60(2):144-166.

22. Nakamura-Sakai S., **Shung DL**,** Jasjeet Sekhon** Enhancing Collaborative Medical Outcomes through Private Synthetic Hypercube Augmentation: PriSHA. Proceedings of the fifth Conference on Health, Inference, and Learning 2024, PMLR 248:55-71. https://proceedings.mlr.press/v248/

23. Giuffrè M, **Shung DL**. Harnessing the power of synthetic data in healthcare: innovation, application, and privacy. NPJ Digit Med. 2023 Oct 9;6(1):186.

24. You K, **Shung DL**, Giuffrè M. On the Wasserstein Median of Probability Measures. *Journal of Computational and Graphical Statistics*, 1–14. 2024

25. Giuffrè M*, Dupont J*, Visintin A, Masutti F, Monica F, You K, **Shung DL**, Crocè LS. NSBB-Elasto-Response-Prediction Group. Predicting response to non-selective beta-blockers with liver-spleen stiffness and heart rate in patients with liver cirrhosis and high-risk varices. Hepatol Int. 2024 Apr 25.

26. Kresevic S*, Giuffrè M*, Ajcevic M, Accardo A, Crocè LS, **Shung DL**. Optimization of hepatological clinical guidelines interpretation by large language models: a retrieval augmented generation-based framework. NPJ Digit Med. 2024 Apr 23;7(1):102. doi: 10.1038/s41746-024-01091-y.

27. **Shung DL**, Laine L. Review article: Upper gastrointestinal bleeding - review of current evidence and implications for management. Aliment Pharmacol Ther. 2024 May;59(9):1062-1081.

28. **Shung DL**, Lin JK, Laine L. Achieving Value by Risk Stratification With Machine Learning Model or Clinical Risk Score in Acute Upper Gastrointestinal Bleeding: A Cost Minimization Analysis. Am J Gastroenterol. 2024 Feb 1;119(2):371-373

29. Alur R, Laine L, Li D, Raghavan M, Shah D, **Shung DL**. Auditing for Human Expertise. Advances in Neural Information Processing Systems 36 (NeurIPS 2023).
https://proceedings.neurips.cc/paper_files/paper/2023

30. Zheng N, Ma W, **Shung DL**, Strate L, Chan A. Sex, Race, and Ethnicity Differences in Patients Presenting with Diverticular Disease at Emergency Departments in the United States. Gastro Hep Advances 3(2):178-180. 2023

31. Li DK, Laine L, **Shung DL**. Trends in Upper Gastrointestinal Bleeding in Patients on Primary Prevention Aspirin: A Nationwide Emergency Department Sample Analysis, 2016-2020. Am J Med. 2023 Sep 9:S0002-9343(23)00542-9.

32. You K, **Shung DL**, "On the Spherical Laplace Distribution," Proceedings of the 2023 26th International Conference on Information Fusion (FUSION), pp. 1-8, doi: 10.23919/FUSION52260.2023.10224108.

33. Rodriguez NJ, Zheng N, Mezzacappa C, Canavan M, Laine L, **Shung DL**. Disparities in Access to Endoscopy for Patients With Upper Gastrointestinal Bleeding Presenting to Emergency Departments. Gastroenterology. 2023 Jun;164(7):1044-1046.e4.

34. Giuffrè M, You K, **Shung DL**. Evaluating ChatGPT in Medical Contexts: The Imperative to Guard Against Hallucinations and Partial Accuracies. Clinical Gastroenterology and Hepatology, Volume 22, Issue 5, 1145 – 1146

35. Plana D*, **Shung DL***, Grimshaw AA, Saraf A, Sung JJY, Kann BH. Randomized Clinical Trials of Machine Learning Interventions in Health Care: A Systematic Review. JAMA Netw Open. 2022 Sep 1;5(9):e2233946

36. Zheng NS, Tsay C, Laine L, **Shung DL**. Trends in characteristics, management, and outcomes of patients presenting with gastrointestinal bleeding to emergency departments in the United States from 2006 to 2019. Aliment Pharmacol Ther. 2022 Dec;56(11-12):1543-1555.

37. You K, **Shung DL**. Rdimtools: An R package for dimension reduction and intrinsic dimension estimation. Software Impacts. 2022; 14(100414): 2665-9638

38. Zheng NS, **Shung DL**, Kerby EH. Racial and ethnic differences in hospital admissions for cellulitis in the United States: A cross-sectional analysis. J Am Acad Dermatol. 2022 Aug 27:S0190-9622(22)02613-5.

39. Lam TYT, Cheung MFK, Munro YL, Lim KM, **Shung DL**, Sung JJY. Randomized Controlled Trials of Artificial Intelligence in Clinical Practice: Systematic Review. J Med Internet Res. 2022 Aug 25;24(8):e37188.

40. Kuchroo M*, Huang J*, Wong P*, Grenier JC, **Shung DL**, Tong A, Lucas C, Klein J, Burkhardt D, Gigante S, Godavarthi A, Rieck B, Israelow B, Simonov M, Mao T, Oh JE, Silva J, Takahashi T, Farhadian S, Dela Cruz CS, Ko AI, Hirn MJ, Wilson FP, Hussin J, Wolf G, Iwasaki A**, Krishnaswamy S**. Multiscale PHATE Identifies Multimodal Signatures of COVID-19. Nat Biotechnol. 2022 May;40(5):681-691.

41. Amodio M, **Shung DL**, Burkhardt D, Wong P, Simonov M, Yamamoto Y, van Dijk D, Wilson FP, Iwasaki A, Krishnaswamy S. Generating hard-to-obtain information from easy-to-obtain information: applications in drug discovery and clinical inference. Cell Patterns (2021)

42. **Shung DL**, Huang J, Castro E, Tay JK, Simonov M, Laine L, Batra R, Krishnaswamy S. Neural network predicts need for red blood cell transfusion for patients with acute gastrointestinal bleeding admitted to the intensive care unit. Sci Rep. 2021 Apr 23;11(1):8827.

43. Shen L, Kann BH, Taylor AR, **Shung DL**. The Clinician's Guide to the Machine Learning Galaxy. Frontiers in Physiology. 2021 12:414.

44. **Shung DL,** Sung JJY. Challenges of Developing Artificial Intelligence-Assisted Tools for Clinical Medicine. Journal of Gastroenterol Hepatol. 2021 Feb. 36(2):295-298.

45. **Shung DL.** Advancing Care for Acute Gastrointestinal Bleeding Using Artificial Intelligence. Journal of Gastroenterol Hepatol. 2021 Feb. 36(2):273-278.

46. **Shung DL,** Tsay C, Laine L, Chang D, Li F, Thomas P, Partridge C, Simonov M, Hsiao A, Tay JK, Taylor A. Early identification of patients with acute gastrointestinal bleeding using natural language processing and decision rules. J Gastroenterol Hepatol. 2021 Jun;36(6):1590-1597.

47. Tsay C, **Shung DL,** Stemmer Frumento K, Laine L. Early Colonoscopy Does Not Improve Outcome in Lower Gastrointestinal Bleeding: Systematic Review of Randomized Trials. Clin Gastroenterol Hepatol. 2019 Dec 13. pii: S1542-3565(19) 31436-3.

48. **Shung DL**, Au B, Taylor RA, Tay JK, Laursen SB, Stanley AJ, Dalton HR, Ngu J, Schultz M, Laine L. Validation of a Machine Learning Model That Outperforms Clinical Risk Scoring Systems for Upper Gastrointestinal Bleeding. Gastroenterology. 2020 Jan;158(1):160-167

49. **Shung DL,** Simonov M, Gentry M, Au B, Laine L. Machine Learning to Predict Outcomes in Patients with Acute Gastrointestinal Bleeding: A Systematic Review. Dig Dis Sci. 2019 May; 64(8):2078–2087.

50. **Shung DL,** Garcia-Tsao G. Liver Capsule: Portal Hypertension and Varices: Pathogenesis, Stages, and Management. Hepatology. 2017 Mar;65(3):1038

51. **Shung DL**, Allen JI. Unlocking Secrets of Inflammatory Bowel Disease. Science & Diplomacy, Vol. 4, No. 4 (December 2015*). http://www.sciencediplomacy.org/article/2015/unlocking-secrets-inflammatory-bowel-disease

52. **Shung DL**, Abraham B, Sellin J, Hou JK. Medical and surgical complications of inflammatory bowel disease in the elderly: a systematic review. Dig Dis Sci. 2015 May; 60(5):1132-40.

BOOK CHAPTERS

1. Kizilcec R, **Shung DL**, Sung JJY. Chapter 10 - Human-machine interaction: AI-assisted medicine, instead of AI-driven medicine, Artificial Intelligence in Medicine, Academic Press 2024: Pages 131-140.

2. **Shung DL**, Laine L. Chapter 2 - Data access, data bias, data equity. Artificial Intelligence in Medicine, Academic Press 2024: Pages 13-26

3. **Shung DL,** Byrne M. How Artificial Intelligence Will Impact Colonoscopy and Colorectal Cancer Screening. Gastrointest Endosc Clin N Am. 2020 Jul;30(3):585-595. doi: 10.1016/j.giec.2020.02.010. Epub 2020 Apr 11.

4. **Shung DL,** Lim JK. Chapter 1: Drug-Induced Liver Injury. Liver Disease: A Clinical Casebook. 2019 ISBN 978-3- 319-98505-3

EDITORIALS, COMMENTARIES, LETTERS

1. **Shung DL**, Iacucci M. Artificial Intelligence in Gastroenterology and Hepatology: Potential and Perils. Gastroenterology. 2025 Aug;169(3):391-392. doi: 10.1053/j.gastro.2025.05.004. Epub 2025 May 13. PMID: 40374062.

2. **Shung DL**. From Tool to Team Member: A Second Set of Eyes for Polyp Detection. Ann Intern

Med. 2023 Sep;176(9):1271-1272.

3. Giuffre M, Distefano A, Kreseic S, Croce LS, **Shung DL**. Guideline-Enhanced Large Language Models Outperforms Physician Test Takers on EASL Campus Quizzes Multiple Choice Questions. JHEP Reports, Volume 0, Issue 0 101523.

4. Hussain N, **Shung DL.** Editorial: Vitamin K Antagonists Versus Direct Oral Anticoagulants in Upper Gastrointestinal Bleeding. Aliment. Pharm. Ther. 2021; 53: 751-752.

5. **Shung DL**, Sung, JJY. A new scoring system for upper gastrointestinal bleeding: Too simple or still complicated? J Gastroenterol Hepatol. 2020 Jan;35(1):5.2020

6. **Shung DL**, Laine L. Machine Learning Prognostic Models for Gastrointestinal Bleeding Using Electronic Health Record Data. Am. J. Gastro. 2020 Aug;115(8):1199-1200.

7. **Shung DL**, Assis DN. Machine Learning in a Complex Disease: PREsTo Improves the Prognostication of Primary Sclerosing Cholangitis. Hepatology. 2019 Dec 18. doi: 10.1002/hep.31069

PREPRINTS

Hicke Y*, Geathers J*, Rajashekar N, Chan C, Jack AG, Sewell J, Preston M, Cornes S, **Shung DL**, Kizilcec R. MedSimAI: Simulation and Formative Feedback Generation to Enhance Deliberate Practice in Medical Education. https://arxiv.org/pdf/2503.05793

J Geathers*, Hicke Y*, Chan C, Rajashekar N, Sewell J, Cornes S, Kizilcec R, **Shung DL**. Benchmarking Generative AI for Scoring Medical Student Interviews in Objective Structured Clinical Examinations (OSCEs). https://arxiv.org/pdf/2501.13957

Adibi A, Cao X, Ji Z, Kaur JN, Chen W, Healey E, Nuwagira B, Ye W, Woollard G, Xu MA, Cui H, Xi J, Chang T, Bikia V, Zhang N, Noori A, Xia Y, Hossain B, Frank HA, Peluso A, Pu Y, Shen SZ, Wu J, Fallahpour A, Mahbub S, Duncan R, Zhang Y, Cao Y, Xu Z, Craig M, Krishnan RG, Beheshti R, Rehg JM, Karim M, Coffee M, Celi LA, Fries JA, Sadatsafavi M, **Shung DL**, McWeeney S, Dafflon J, Jabbour S. Recent Advances, Applications and Open Challenges in Machine Learning for Health: Reflections from Research Roundtables at ML4H 2024 Symposium. https://arxiv.org/pdf/2502.06693

You K, Kim I, Jin IH, Jeon M, **Shung DL**. Comparing multiple latent space embeddings using topological analysis. August 2022. https://arxiv.org/abs/2208.12435

Brudermueller T, **Shung DL**, Laine L, Stanley AJ, Laursen SB, Dalton HR, Ngu J, Schultz M, Stegmaier J, Krishnaswamy S. Making Logic Learnable With Neural Networks. February 2020. arXiv:2002.03847v2

INVITED LECTURES

2025: "AI and Natural Language Processing in the Electronic Health Record." **Invited Lecture.** AI Beyond the Endoscope: How AI is Revolutionizing GI Practice. Digestive Diseases Week. May 6th, 2025. San Diego, CA.

2025: "Using AI to Assess GI Trainee Skills." **Invited Lecture**. AGA Academy of Educators Plenary: Intelligent Use of Artificial Intelligence in Gastroenterology Education. Digestive Diseases Week. May 5th, 2025. San Diego, CA

2025: "Innovative Use of Large Language Models as Medical Chatbots for Intestinal Diseases." **Distinguished Invited Lecture.** 8th International Meeting on Intestinal Diseases in conjunction with the Annual Congress of the Korean Association for the Study of Intestinal Diseases [IMKASID 2025]. April 12th, 2025. Seoul, South Korea.

2025: "Integrated Artificial Intelligence to Supercharge Research Productivity" **Invited Lecture.** University of

Toronto. (Virtual) April 2025.

2025:   "Machine learning for prediction of GI bleeding" **Invited Lecture**. International Symposium on Helicobacter and Upper Gastrointestinal Diseases (HUG 2025) & the 33rd Annual Meeting of the Korean College of Helicobacter and Upper Gastrointestinal Research, in conjunction with the 21st Korea-Japan Joint Symposium on Helicobacter Infection. March 21st, 2025. Seoul, South Korea.

2024:   "The Generative AI Flywheel." **Invited Lecture.** Boston IT Party. New England Donor Services. December 12th, 2024. Boston, MA. USA.

2024:   Roundtable Discussion: Machine Learning for Health Symposium. **Senior Chair.** Association for Health Learning and Inference. December 15-16th, 2024. Vancouver, Canada.

2024:   "From Point Solutions to Platform Solutions: Generative Artificial Intelligence to Advance Patient Care, Education, and Research." **Invited Lecture.** Gastroenterology Grand Rounds. Mayo Clinic. November 21st, 2024. Rochester, MN.

2024:   "A Framework for Deploying and Evaluating Generative Artificial Intelligence." **Invited Lecture**. Health Gen AI Prompt-A Thon: The Connecticut Health AI Collaborative. November 14th, 2024. Hartford, CT.

2024:   "Artificial Intelligence for Acute Gastrointestinal Bleeding." **Invited Lecture**. Gastroenterology Grand Rounds. Mt. Sinai School of Medicine. October 11, 2024. New York, New York.

2024:   "AI: Alien Intelligence." **Invited Lecture**. GI Fellows' Medical Education Conference. Mt. Sinai School of Medicine. October 10, 2024. New York, New York.

2024:   "Human-AI Teaming: The Future of Artificial Intelligence, an Early Career Perspective." **Keynote Address.** 2024 American Gastroenterological Association Leadership Summit. September 26-28, 2024. Washington D.C.

2024:   "Balancing Human Expertise and AI in Gastroenterology." **Invited Lecture**, 6th Annual Global Artificial Intelligence Summit. American Society for Gastrointestinal Endoscopy. September 7-9, 2024. Washington D.C.

2024:   "AI: The Next Frontier in Reshaping Practice". **Invited State-of-the-Art Lecture.** American Gastroenterological Association, Digestive Diseases Week, Washington, DC, May 2024.

2024:   "AI: Where is the Road Taking Us?". **Invited Lecture.** Digestive Diseases Week, Washington, DC, May 2024.

2024:   "AI & Machine Learning Primer in GI Cancer". **Invited Lecture.** American Gastroenterological Association, Digestive Diseases Week, Washington, DC, May 2024.

2024:   "AI and Nonhuman Authors". **Invited Lecture.** American Gastroenterological Association, Digestive Diseases Week, Washington, DC, May 2024.

2024:   "AI and GI Training and Education: Applications of GenAI to the Future of Medical Training". **Invited Lecture.** Digestive Diseases Week, Washington, DC, May 2024.

2024:   "Testing and Implementing Artificial Intelligence Interactions with Clinicians Using Immersive Simulation". **Oral Presentation.** 24th International Meeting on Simulation in Healthcare, San Diego, CA, January 2024.

2023:   "Digital Twin for Artificial Intelligence in Healthcare." **Keynote Lecture**; Natural Language Processing Day, Yale Section of Biomedical Informatics and Data Science. October 3rd, 2023. New Haven, CT.

2023:   "Harmonizing Health and AI: Navigating Innovation and Ethics." **Invited Lecture.** Yale Human Research Symposium. September 8th, 2023. New Haven, CT.

2023:   "Democratising Medical Care Using AI." **Invited Lecture.** International Artificial Intelligence in Medicine Conference (iAIM). August 5th, 2023. Singapore.

2023:   "Applying Artificial Intelligence (AI) to Data in Liver Diseases." **Invited Lecture.** Multi-Omics Approaches for Cholestatic Liver Diseases: From Diagnosis to Disease Mechanisms and Precision Medicine. American Association for the Study of Liver Diseases (AASLD) Emerging Topic Conference 2023. June 2nd, 2023.

2022:   "Predicting Outcomes in Patients with GI Bleeding: The Future is Now." **Invited Lecture.** Newport The Endoscopy Course. October 13th, 2022. Newport, RI.

2022:   "Enhancing Human Presence with Artificial Intelligence in Medicine." **Lee Kong Chian Medicine Open Lecture.** Lee Kong Chian School of Medicine, Nanyang Technological University. August 15th, 2022. Singapore.

2022:   "Pursuing Research in AI in GI and Endoscopy: Basics and Terminology." **Invited Lecture.** ASGE 2022 AI in GI Workshop. May 20th, 2022. San Diego, CA.

2022:   "Setting the Stage: the Promise of AI in GI: Artificial Intelligence and the Brave New World". **Invited Lecture.** Digestive Diseases Week Combined Clinical Symposium. May 24th, 2022. San Diego, CA.

2022:   "Artificial Intelligence to Advance Care for Patients with Upper Gastrointestinal Bleeding." **Gastroenterology Grand Rounds**, University of Michigan School of Medicine. Ann Arbor, MI, April 2022

2021:   "Advancing Care for Acute Gastrointestinal Bleeding Using Artificial Intelligence." **Grand Rounds**, Yale Department of Medicine. August 5th, 2021. New Haven, CT

2020:   "Artificial Intelligence for Acute Gastrointestinal Bleeding" **Invited Lecture.** Tech Summit Faculty, 11th Annual Technology Summit, American Gastroenterological Association and the Center for Gastrointestinal Innovation and Technology (virtual)

2019:   "Artificial Intelligence to Advance Care for Patients with Upper Gastrointestinal Bleeding." **GI Grand Rounds.** Baylor College of Medicine, Houston, TX.

PRESENTATIONS *both are first authors; **both are senior authors

Chung S, Rajashekar N, Pu Y, Shin YE, Giuffrè M, Chan C, You K, Saarinen T, Hsiao A, Sekhon J, Wong A, Evans L, McCall T, Kizilcec RF, Laine L, Shung D. Randomized Controlled Trial Evaluating the Efficacy of Human-Generative Artificial Intelligence Teaming on Technology Acceptance, Usability, and Trust: The Gut-GPT Simulation Study. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Oral Presentation**

Ko Y, Yun N, Shung D, Stadie B. Automated Prompt Optimization Strategy Improves Large Language Model Diagnostic Accuracy for Complex Clinical Cases in Gastroenterology and Hepatology. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Pu Y, Li DK, Shung D. Risk Factors for 7-Day Rebleeding and 1-Year MACE in Patients with Acute Gastrointestinal Bleeding Post-Percutaneous Coronary Intervention. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Zhang X, Kim JY, Pu Y, Loza AJ, Tong A, Shung D. Generative Artificial Intelligence for Dynamic Risk Assessment to Predict Trajectories in Patients with Acute Gastrointestinal Bleeding in the Intensive Care Unit. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Oral Presentation**

Zhong J, Khosravi B, Onofrey J, Shung D. Deep Learning-Based Automated 3D Rendering of the Pancreas Using Magnetic Resonance Imaging. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Giuffrè M, You K, Pang Z, Kresevic S, Chung S, Chen R, Ko Y, Chan C, Saarinen T, Ajcevic M, Crocè LS, Garcia-

Tsao G, Gralnek IM, Sung JJY, Barkun A, Laine L, Sekhon J, Stadie B, Shung D. Expert-Aligned Unsupervised Embeddings for Ranking Clinical Large Language Models: A Study in Upper Gastrointestinal Bleeding. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Giuffrè M, You K, Pang Z, Kresevic S, Chung S, Chen R, Ko Y, Chan C, Saarinen T, Ajcevic M, Crocè LS, Garcia-Tsao G, Gralnek IM, Sung JJY, Barkun A, Laine L, Sekhon J, Shung D, Stadie B. Automated Safety Screening of Clinical Language Models Using a Reward Model: A Validation Study in Management of Upper Gastrointestinqal Bleeding. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Saberzadeh-Ardestani B, Zheng NS, Shung D. Disparities in Emergency Department Utilization Among Patients by Race with Inflammatory Bowel Disease in the United States. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Chung S, Sharma S, Xie QQ, Levy A, Xu H, Shung D. Identifying Patients with Acute Severe Ulcerative Colitis at Scale Using a Privacy Preserving Local Large Language Models for Low Resource Settings. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Giuffrè M, Kresevic S, Ravaioli F, Colecchia L, Zykus R, Rautou PE, Elkrief L, Grgurevic I, Stefanescu S, Hirooka M, Fraquelli M, Rosselli M, Chang J, Crocè LS, Ajcevic M, Piscaglia F, Reiberger T, Llop E, Mueller S, Marasco G, Azzaroli F, Berzigotti A, **Shung D**, Colecchia A, Dajti E. External Validation of a Pan-Elastographic Machine Learning Model for Non-Invasive Diagnosis of Clinically Significant Portal Hypertension. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Giuffrè M, Kresevic S, Distefanov A, Gulotta M, Orbosuè F, Ajcevic M, Crocè LS, Shung DL. Optimizing Large Language Models for Hepatology: A Comprehensive Evaluation of Retrieval-Augmented Generation and Supervised Fine-Tuning on EASL Guidelines. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Bradley CP, Leven EA, Peraza J, Nagula S, Rao B, Shah BJ, Berzin TM, **Shung DL**, Soroush A. Implementation and Assessment of an Artificial Intelligence Educational Program in Gastroenterology: A Pre-Post Assessment Study. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Chung S, Saberzadeh-Ardestani, Nigam GB, Yuan Y, Singh S, **Shung D**. Human-AI Teaming to Facilitate Evidence Synthesis for Clinical Guideline Development: Development and Validation of a Large Language Model Based Pipeline. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Zhong J, Onofrey J, Shung D. Image Processing Techniques for Pancreatic Abnormality Detection on Magnetic Resonance Imaging: Proof of Concept. Digestive Diseases Week 2025. May 2025. San Diego, CA. **Poster Presentation**

Zhang X*, Pu Y*, Kawamura Y, Loza A, Bengio Y, Tong A**, **Shung DL****. Trajectory Flow Matching with Applications to Clinical Time Series Modelling. Advances in Neural Information Processing Systems (NeurIPS) 2024. **Spotlight Presentation (Top 3%)**

Rajashekar NC*, Shin Y*, Pu Y*, Chung S, You K, Giuffre M, Chan C, Saarinen T, Hsiao A, Sekhon J, Wong A, Evans L, Kizilcec R, Laine L, McCall T, **Shung DL.** 2024. Human-Algorithmic Interaction Using a Large Language Model-Augmented Artificial Intelligence Clinical Decision Support System. 2024 CHI Conference on Human Factors in Computing Systems (CHI '24). Honolulu, HI. **Oral Presentation.**

Chung S, Rajashekar N, Pu Y, Shin YE, Giuffre M, Chan C, You K, Saarinen T, Hsiao A, Sekhon J, Wong A, Evans L, McCall T, Kizilcec R, Laine L, **Shung DL**. Impact of Artificial Intelligence Systems for Upper Gastrointestinal Bleeding on Clinician Trust and Learning Using Large Language Models: A Randomized Pilot Simulation Study. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Oral Presentation.**

Zheng N, Keloth V, You K, Li D, Xu H, Laine L, **Shung DL**. Automated Identification of Recurrent Gastrointestinal Bleeding Using Electronic Health Records and Large Language Models. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Oral Presentation.**

Zheng N, Keloth V, You K, Li D, Xu H, Laine L, **Shung D**L. Identifying Overt Signs of Acute Gastrointestinal Bleeding in the Electronic Health Record with Large Language Models. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Oral Presentation.**

Kresevic S, Giuffre M, **Shung DL**. Enhancing Clinical Decision Support with Large Language Models: A Tailored Pipeline for Accurate Interpretation of Hepatitis C Management Guidelines. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Oral Presentation.**

Zhong J, Sehgal K, Hickey K, Mohammad A, Robinson S, Farrell J, **Shung DL**. A Local Large Language Model Pipeline Automatically Risk Stratifies Pancreatic Cysts for Population Health Management from Serial Radiology Reports. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation.**

Giuffre M, You K, Chung S, Kresevic S, Chan C, Saarinen T, Nakamura S, Laine L, Sung JJY, Garcia-Tsao G, Gralnek I, Barkun A, Sekhon J, **Shung DL.** Gut-GPT: Novel Large Language Model Pipeline Outperforms other Large Language Models in Accuracy and Similarity to International Experts for Guideline Recommended Management of Patients with Upper Gastrointestinal Bleeding. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Rajashekar N, Chan C, Laine L, **Shung DL**. A Large Language Model-Based Simulated Patients with Upper Gastrointestinal Bleeding for Medical Education – A Pilot Study with EmpathGPT. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Giuffre M, **Shung DL**. Interactive Clinical Guidelines with Large Language Models: The Gut-GPT Series on American Gastroenterology Association Guidelines. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Burton S, **Shung DL**, Aslanian H. Patient Perspective of Use of Artificial Intelligence During Colonoscopy. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Soleymanjahi S, Kolb J, Chung S, Foroutan F, Sultan S, **Shung DL**. Provider Trust Towards Adopting Real Time Artificial Intelligence in Colonoscopy: A Systematic Review. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Soleymanjahi S, Huebner J, Elmansy L, Rajashekar N, Paracha R, **Shung DL**. Performance of Different Computer-Aided Detection (CADe) Platforms Compared to Conventional Colonoscopy: A Systematic Review and Meta-Analysis. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Rajashekar N, Chan C, Deutsch J, Laine L, **Shung DL**. Simulating the Patient-Practitioner Relationship in Patients with Irritable Bowel Syndrome with Large Language Model-Based Tools – A Proof of Concept. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Dupont J, Giuffre M, Zhong J, You K, Laine L, **Shung DL**. Deep Learning to Classify Endoscopic Stigmata for Patients with Acute Upper Gastrointestinal Bleeding. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Dupont J, Giuffre M, Zheng N, Laine L, **Shung DL**. Validation of a Multimodal Machine Learning Model for Post-Endoscopic Risk Stratification in Acute Upper Gastrointestinal Bleeding. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Luedtke N, **Shung DL**. Automated Extraction of Randomized Controlled Trial Data Using Large Language Models: A Pilot Study with Vedolizumab Meta-Analysis. Digestive Diseases Week 2024. May 18, 2024. Washington D.C. **Poster Presentation**.

Giuffre M, Kresevic S, Croce SL, **Shung DL**. Using retrieval augmented generation to increase large language models accuracy: a proof-of-concept pipeline on European Hepatitis C Virus (HCV) Guidelines. European Association for the Study of the Liver (EASL) Congress 2024. June 5-8, 2024. Milan, Italy. **Poster Presentation.**

Chan C, You K, Chung S, Giuffrè M, Saarinen T, Rajashekar N, Pu Y, Shin YE, Laine L, Wong A, Kizilcec R, Sekhon J, **Shung DL**. "Assessing the Usability of GutGPT: A Simulation Study of an AI Clinical Decision Support System for Gastrointestinal Bleeding Risk." Machine Learning For Health at Neural Information Processing Systems 2023. New Orleans, LA. **Poster Presentation.**

Alur R, Laine L, Li D, Raghavan M, Shah D, **Shung DL.** Auditing for Human Expertise. Neural Information Processing Systems 2023. New Orleans, LA. **Spotlight Designation (top 3%).**

Kats D, Zheng N, Huebner J, Paracha R, Melo M, DuPont J, **Shung DL**, Li D. Management of Direct Acting Oral Anticoagulants in Hospitalized Patients With Upper Gastrointestinal Bleeding: A Real-World Observational Study. American College of Gastroenterology 2023 Annual Scientific Meeting & Postgraduate Course. **Poster Presentation.**

You K, **Shung DL**, "On the Spherical Laplace Distribution," 26th International Conference on Information Fusion (FUSION), Charleston, SC, USA, 2023. **3rd Place Jean-Pierre Le Cadre Best Paper Award.**

Zhong J, Dupont J, Aslanian H, Onofrey J, **Shung DL**. A Comparison of Supervised and Unsupervised Methods for Polyp Segmentation. 2023 Digestive Diseases Week. **Oral Plenary Presentation.**

Soleymanjahi S, Rajashekar N, Elmansy L, **Shung DL**. Performance of Artificial Intelligence Assisted Colonoscopy versus Conventional Colonoscopy: A Systematic Review and Meta-Analysis. 2023 Digestive Diseases Week. **Poster Presentation.**

Dupont J, Zheng N, Laine L, **Shung DL**. Identifying Patients with Acute Gastrointestinal Bleeding Using Note Text in the Electronic Health Record: A Hybrid Natural Language Processing and Deep Learning Approach. 2023 Digestive Diseases Week. **Poster Presentation.**

Huebner J, Chung S, Kizilcec R, **Shung DL**. Provider Trust and Perceived Usefulness of Machine Learning Risk Stratification Tool for Acute Upper Gastrointestinal Bleeding Using the Technology Acceptance Model: A Pilot Study. 2023 Digestive Diseases Week. **Poster Presentation.**

Zheng N, Ma W, **Shung DL**, Strate L, Chan A. Sex, Race, and Ethnicity Differences in Patients Presenting with Diverticular Disease at Emergency Departments in the United States. 2023 Digestive Diseases Week. **Poster Presentation.**

You K, **Shung DL.** Characterizing the nonlinear geometry of neural representations. DeepMath 2022. San Diego, CA. **Poster Presentation.**

Shung DL, Simonov M, Tsay C, Kawamura Y, Partridge C, Thomas P, Zheng N, Tay K, Hsiao A, Laine, L. External Validation of an Electronic Health Record-Based Deep Learning Model for Automated Rapid Risk Stratification of Patients Presenting with Acute Gastrointestinal Bleeding. 2022 Digestive Diseases Week. **Oral Presentation.**

Rodriguez NJ, Zheng NS, Mezzacappa C, Canavan M, Laine L, **Shung DL**. Disparities in Access to Endoscopy for Patients with Upper Gastrointestinal Bleeding Presenting to Emergency Departments. 2022 Digestive Diseases Week. **Oral Presentation.**

Zheng NS, Tsay C, Laine L, **Shung DL.** Trends in Characteristics, Management, and Outcomes of Patients Presenting with Gastrointestinal Bleeding to Emergency Departments in the United States from 2006 to 2019. 2022 Digestive Diseases Week. **Oral Presentation.**

Shung DL, Lin JK, Laine L. Cost Minimization Analysis of Applying Risk Stratification to Patients Presenting with Acute Upper Gastrointestinal Bleeding. 2022 Digestive Diseases Week. **Poster Presentation.**

Zheng NS, Laine L, **Shung DL**. Impact of Long-term Antithrombotic Therapy on Patients Who Present with Upper Gastrointestinal Bleeding. 2022 Digestive Diseases Week. **Poster Presentation.**

Jiang D, Han J, Morten C, **Shung DL**, Aneja S, Dhruva S, Noseworthy PA, Friedman P, Ross J, Shah N. Regulatory

Frameworks and Evidence for FDA Approvals of AI-Based Software As a Medical Devices. AcademyHealth Annual Research Meeting. June 4-7, 2022. Washington, D.C. **Poster Presentation.**

Shung DL, Li DK. Hospital Outcomes in Patients with Gastrointestinal Bleeding on Primary Prevention Aspirin: A Nationwide Emergency Department Sample Analysis. American College of Gastroenterology 2022 Annual Scientific Meeting & Postgraduate Course.

Tong A*, Huguet G*, **Shung DL*,** Natik A, Kuchroo M, Lajoie G, Wolf G, Krishnaswamy S. Embedding Signals on Knowledge Graphs with Unbalanced Diffusion Earth Mover's Distance. 47th International Conference on Acoustics, Speech, & Signal Processing (ICASSP). Singapore 2022. **Oral Presentation.**

Gerasimiuk M*, **Shung DL*,** Tong A, Stanley A, Schultz M, Ngu J, Laine L, Wolf G, Krishnaswamy S. MURAL: An unsupervised random forest-based embedding for electronic health record data, 2021 IEEE International Conference on Big Data (Big Data) Health Care Special Session. **Oral Presentation.**

Tsay C, **Shung DL**, Laine L. Changing Practices and outcomes in Patients Presenting to the Emergency Department with Gastrointestinal Bleeding. Digestive Diseases Week 2021. **Poster Presentation.**

Shung DL, Simonov M, Tsay C, Hsiao A, Partridge CM, Thomas P, Laine L. An Electronic Health Record-based Machine Learning Model to Provide Automated Rapid Risk Stratification of Patients Presenting with Gastrointestinal Bleeding Outperforms Glasgow-Blatchford Score. Digestive Diseases Week 2020. **Esophageal, Gastric & Duodenal Disorders (EGD) Section Distinguished Abstract Plenary.**

Shung DL, Tsay C, Laine L, Thomas P, Partridge CM, Hsiao A, Taylor RA. Identifying Patients with Acute Gastrointestinal Bleeding with Electronic Health Record Phenotypes. Digestive Diseases Week 2020. **Poster Presentation.**

Castro E, **Shung DL**. Neural Network Predicts Drop in Hemoglobin Requiring Transfusion for Patients with Acute Gastrointestinal Bleeding Admitted to the ICU. Digestive Diseases Week 2020. **Oral Presentation.**

Shung DL, Hung KH, Laine L, Hughes, ML. Adopting a GI Hospitalist Model: A New Method for Increasing Procedural Volume. American College of Gastroenterology Annual Scientific Meeting & Postgraduate Course 2020 (online) **Category Award (General Endoscopy), Oral Presentation.**

Shung DL, Au B, Taylor A, Tay JK, Laursen S, Stanley A, Dalton H, Ngu J, Schultz M, Laine L. Development and Validation of Machine Learning Models to Predict Outcomes in UGIB with Comparison to Clinical Risk Scores. Digestive Diseases Week 2019. San Diego, CA May 19, 2019. **Oral Presentation**.

Shung DL, Simonov M, Gentry M, Au B, Laine L. Machine Learning to Predict Outcomes in Patients with Acute Gastrointestinal Bleeding: Systematic Review and Meta-Analysis. Digestive Diseases Week 2018. Washington D.C. June 4, 2018. **Poster Presentation; Poster of Distinction**.

Shung DL, Russell MB, Pahade J, Balcacer P, Huber S, Ryabtsev R, and Sanchez de la Cruz M. High Resolution Anorectal Manometry Compared to Dynamic Pelvic Magnetic Resonance Imaging in Fecal Incontinence. Digestive Diseases Week 2016. San Diego, CA. May 21-24, 2016. **Poster Presentation.**

Shung DL*, Stahl M*, Dunne D, Siegel M, Connors GR. The Yale 20: An innovative resident-designed online learning series in Internal Medicine. Society of General Internal Medicine 2016 New England Regional Meeting. New Haven, CT. March 11, 2016. **Oral Presentation.**

Shung DL, Ng S. Lamenting: How Christian Narratives Can Inform a Physician's Approach to Grief and Death. 5th Annual Conference on Medicine and Religion. Houston, TX. March 4-6, 2016. **Poster Presentation.**

Shung DL*, Lin J*, Chou A, Heberlig S, Medford-Davis L, Siler-Fisher A. Randomized Controlled Trial Evaluating the Impact of a Novel Volunteer-run Discharge Planning Program on Follow-up Appointment Adherence. American College of Emergency Physicians (ACEP) Scientific Assembly 2015. Boston, MA. October 26-29, 2015. **Poster Presentation.**

Peterson M, **Shung DL**, Cai C, Chou A, Law N, Rees M. Creating a Healthcare Improvement Curriculum. Institute for Healthcare Improvement 25th Annual National Forum. December 8-11, 2013. **Poster Presentation.**

Shung DL, Ng SV, Stewart DE, Trautner BW. Optimizing Medical Discharge through Interdisciplinary Communication. AAMC 2013 Integrating Quality Meeting: Improving Value and Educating for Quality. Rosemont IL. June 6-7, 2013 **Poster Presentation.**

ARTICLES & MULTIMEDIA

Featured Expert for AI and Colonoscopy. WFSB Segment on AI and Medicine: December 11, 2024. https://www.wfsb.com/video/2024/12/11/researchers-yale-working-with-ai-make-getting-second-opinion-easier/
Shung DL. On Tech Ethics Podcast – Synthetic Data in Research and Healthcare. Season 1, Episode 26. Collaborative Institutional Training Initiative (CITI) Program. November 7, 2024
Shung DL, Shen L. Digital Health in Managing GI Diseases. Gastroenterology Data Trends 2021. GI & Hepatology News, October 2021.
Shung DL. AI and Machine Learning in GI Practice. Gastroenterology Data Trends 2021. GI & Hepatology News, October 2021.
Shung DL, Peterson M. Creating an Elective at Baylor: Four Steps to Success. IHI Open School. http://www.ihi.org/education/ihiopenschool/resources/Pages/CreatinganElectiveatBaylor.aspx
Shung DL, Connors G. Best of American Thoracic Society (ATS) Video Series - Yale 20: Pleural Effusions https://www.thoracic.org/professionals/clinical-resources/video-lecture-series/pulmonary-miscellaneous/yale-20-pleural-effusions.php
Shung DL, Garcia-Tsao G. Yale 20: Cirrhosis http://yale20.com/cirrhosis.php

TEACHING & EDUCATIONAL ROLES

2024	**Lecturer**, Module 3: Special Considerations for AI/ML-Enabled Medical Devices. Software as Medical Device. Collaborative Institutional Training Initiative (CITI) Program.
2024	**Lecturer**, Module 4: Design, Development, Implementation and Deployment of SaMD and CDSS. Software as Medical Device. Collaborative Institutional Training Initiative (CITI) Program.
2024	**Guest Lecturer**, Artificial Intelligence Education Half Day, Mt. Sinai School of Medicine.
2023	**Lecturer**, Module 2: Introduction to Medical AI & ML. Understand the role and potential of generative AI in medical application. Certificate in Medical Software & Artificial Intelligence. Yale Department of Biomedical Informatics and Data Science.
2020 - 2022	**Guest Instructor,** Biomedical Engineering (BENG) 406: Medical Software Design. Yale College.

Mentorship
Postdoctoral Associates
- **Kisung You, PhD** 2022-2023. Assistant Professor, Department of Mathematics, CUNY Baruch College, NYC NY USA.
- **Mauro Giuffre MD MS** 2023-2025. Assistant Professor, University of Trieste, Trieste Italy.

Postgraduate Associates
- Yuan Pu, BS 2023-2025 PhD program in Computer Science, Duke University
- Jun Yup Kim, BS 2024-2025 Associate Data Scientist, Mayo Clinic Rochester
- Nando Ludtke, BSc 2023-2024 MD Student-Universitat Hamburg
- Johannes Dupont MSc 2023-2024 Senior Machine Learning Engineer, CloudSpot GmbH

Committee Member:
Doctor of Philosophy
- **Donald Wright MD,** Investigative Medicine, Yale Graduate School of Arts and Sciences; *currently Instructor, Department of Emergency Medicine, Yale School of Medicine*
- **Jiayang Zhong,** Biomedical Engineering, Yale Graduate School of Arts and Sciences
- **Shinpei Nakamura-Sakai**, Statistics and Data Science, Yale Graduate School of Arts and Sciences; *currently working as an Applied Scientist at Amazon*

Master's of Health Science

- **Sunny Chung MD**, Clinical Informatics, Yale School of Medicine; *currently Instructor, Section of Digestive Diseases, Department of Medicine at Yale School of Medicine*
- **Mario Felix MD,** Clinical Informatics, Yale School of Medicine; *currently Instructor, Section of Rheumatology, Department of Medicine at Yale School of Medicine*
- **Neil Zheng MD**, Yale School of Medicine; *currently PGY-2 in the Brigham and Women's Internal Medicine Residency Program*
- **Niroop Rajashekar MD**, Yale School of Medicine; *currently PGY-1 in Yale-New Haven Hospital Traditional Internal Medicine Program*

Master's of Public Health
- **William Zhang,** Yale School of Public Health

PROFESSIONAL MEMBERSHIPS

- American Medical Informatics Association
- American Gastroenterological Association
- American College of Gastroenterology
- American Society for Gastrointestinal Endoscopy

PROFESSIONAL ACTIVITIES
Coalition for Healthcare Artificial Intelligence (CHAI)
- **Product Owner, Clinical Decision Support**, Generative AI Work Group 2025-2026
- **Product Owner, Safety and Reliability,** Generative AI Work Group 2024-2025

American Gastroenterological Association
- **External Advisor**, AGA Executive Board 2024-present
- **Lead, AI and Digital Health Taskforce**, Center for GI Innovation and Technology Committee 2023-present
- **Member**, Artificial Intelligence Task Force 2023-2024
- **AI Expert,** Clinical Guidelines Committee 2022-present
- **Committee Member**, Center for GI Innovation and Technology Committee 2022-present
- **Co-Chair**, Digestive Diseases Week 2022 Combined Clinical Symposium on AI and GI
- DDSEP 10 Peer Reviewer 2023
- DDW Abstract Reviewer 2022

American Society for Gastrointestinal Endoscopy
- **Founding Member**, Artificial Intelligence Institute for Gastroenterology, 2024-present

Yale-New Haven Health System
- **Generative AI Expert,** Digital AI Advisory Committee, 2024-2025
- **Co-Chair**, GI Bleeding Care Signature Clinical Pathway, 2020-2025

Yale School of Medicine
- **Member,** Faculty Search Committee for the Yale Center for Brain and Mind Health and Yale Department of Biomedical Informatics and Data Science; 2024-2025
- **Member,** Artificial Intelligence Working Group for Medical Education; 2024-2025
- **Curriculum Development Chair,** Quality Improvement Interest Group; 2015-2017
- **Mentor**, Housestaff Mentorship Program; 2015-2017
- **Fellow,** Program for Medicine, Spirituality & Religion; 2014-2025
- **Internal Medicine Traditional Program Resident Representative**, Graduate Medical Education Committee; 2014-2017
- **Co-creator**, Yale 20 Educational Modules www.yale20.com; 2014-2017

The Albert Schweitzer Fellowship
- **Reviewer**, Albert Schweitzer Fellowship Selection Committee; 2013
- **Fellow**, Houston Chapter of U.S. Schweitzer Fellows Program; 2011-2012

American College of Medical Quality
- **Committee Member**, Education Committee; 2013-2014

Institute for Healthcare Improvement
- **Co-President**, BCM IHI Open School Chapter; 2012-2014

Baylor College of Medicine

- **Steering Committee,** First Annual Baylor College of Medicine Quality and Safety Conference Defining Value in Healthcare: The Patient, Provider, and Payer Perspectives **(CME accredited)** May 15, 2014
- **Committee Chair**, Patient Safety Course Development Committee, BCM; 2013
- **Committee Member**, Longitudinal and Special Subjects Committee, LCME Educational Development Committees; 2012-2014
- **Committee Member**, BCM Patient Safety Rounds Committee; 2011-2012
- **Teaching Assistant**, Patient Safety Course; 2011-2012

Harris County Hospital District/Ben Taub General Hospital
- **Board Co-Chair**, Patient Discharge Initiative; 2012-2014
- **Co-Founder and Co-President**, Patient Discharge Initiative; 2011-2012

ProWorld Service Corps; Cusco, Perú
- Health Intern, ProPerú; 2009