# Stanford



## Carla Pugh, MD, PhD

Thomas Krummel Professor Surgery - General Surgery Curriculum Vitae available Online

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### Bio

#### BIO

Carla Pugh is Professor of Surgery at Stanford University School of Medicine. She is also the Director of the Technology Enabled Clinical Improvement (T.E.C.I.) Center. Her clinical area of expertise is Acute Care Surgery. Dr. Pugh obtained her undergraduate degree at U.C. Berkeley in Neurobiology and her medical degree at Howard University School of Medicine. Upon completion of her surgical training at Howard University Hospital, she went to Stanford University and obtained a PhD in Education. She is the first surgeon in the United States to obtain a PhD in Education. Her goal is to use technology to change the face of medical and surgical education.

Her research involves the use of simulation and advanced engineering technologies to develop new approaches for assessing and defining competency in clinical procedural skills. Dr. Pugh holds three patents on the use of sensor and data acquisition technology to measure and characterize hands-on clinical skills. Currently, over two hundred medical and nursing schools are using one of her sensor enabled training tools for their students and trainees. Her work has received numerous awards from medical and engineering organizations. In 2011 Dr. Pugh received the Presidential Early Career Award for Scientists and Engineers from President Barak Obama at the White House. She is considered to be a lead, international expert on the use of sensors and motion tracking technology for performance measurement. In 2014 she was invited to give a TEDMED talk on the potential uses of technology to transform how we measure clinical skills in medicine. In April 2018, Dr. Pugh was inducted into the American Institute for Medical and Biological Engineering.

#### CLINICAL FOCUS

General Surgery

#### ACADEMIC APPOINTMENTS

- Professor, Surgery General Surgery
- Member, Wu Tsai Human Performance Alliance
- Member, Stanford Cancer Institute

#### **PROFESSIONAL EDUCATION**

- Fellowship: University of Michigan Medical School (2009) MI
- PhD, Stanford University Graduate School of Education , Education & Technology (2001)
- Board Certification: General Surgery, American Board of Surgery (1999)
- Residency: Howard University Hospital General Surgery Residency (1997) DC
- Medical Education: Howard University College of Medicine (1992) DC

#### LINKS

- Getting a Sense for the Surgical Touch: https://www.youtube.com/watch?v=k9D-vxGkHTc
- LinkedIn: https://www.linkedin.com/in/carla-pugh-2ab0b511b/

#### **Research & Scholarship**

#### CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Technology Enabled Clinical Improvement (T.E.C.I.) Center is a multidisciplinary team of researchers dedicated to the design and implementation of advanced engineering technologies that facilitate data acquisition relating to clinical performance.

The T.E.C.I. team has had great success in quantifying physicians' clinical experiences using sensor, video, and motion tracking technologies. This work has resulted in an information rich database that enables empirical evaluation of clinical excellence and medical decision making.

By leveraging highly specific and objective clinical performance metrics, the T.E.C.I. Center is harnessing the unique opportunity to support peer to peer data sharing and clinical collaborations that can transform the clinical workflow and ultimately benefit healthcare providers.

The T.E.C.I. Center aims to transform human health and welfare through advances in data science and personalized, technology-based performance metrics for healthcare providers.

#### Teaching

#### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Calvin Perumalla

#### **Publications**

#### PUBLICATIONS

- Opportunities and Applications of Educational Technologies in Surgical Education and Assessment. *Annals of surgery* Fried, G. M., Varas, J., Telem, D. A., Greenberg, C. C., Hashimoto, D. A., Paige, J. T., Pugh, C. 2024
- Precision Education: The Future of Lifelong Learning in Medicine. Academic medicine : journal of the Association of American Medical Colleges Desai, S. V., Burk-Rafel, J., Lomis, K. D., Caverzagie, K., Richardson, J., O'Brien, C. L., Andrews, J., Heckman, K., Henderson, D., Prober, C. G., Pugh, C. M., Stern, S. D., Triola, et al 2024
- Sensor-Based Discovery of Search and Palpation Modes in the Clinical Breast Examination. Academic medicine : journal of the Association of American Medical Colleges

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• Haptics: The Science of Touch as a Foundational Pathway to Precision Education and Assessment. Academic medicine : journal of the Association of American Medical Colleges

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• Foreword: The Next Era of Assessment and Precision Education. Academic medicine : journal of the Association of American Medical Colleges Schumacher, D. J., Santen, S. A., Pugh, C. M., Burk-Rafel, J. 2023

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- Surgical Instant Replay-A National Video-Based Performance Assessment Toolbox. *JAMA surgery* Yule, S., Dearani, J. A., Pugh, C. 2023
- SAGES consensus recommendations on surgical video data use, structure, and exploration (for research in artificial intelligence, clinical quality improvement, and surgical education). Surgical endoscopy

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- Allyship in action: The critical, missing link to crossing the quality chasm in healthcare. American journal of surgery Pugh, C. M. 2023
- Laying the Groundwork for Optimized Surgical Feedback. *JAMA network open* Shkolyar, E., Pugh, C., Liao, J. C. 2023; 6 (6): e2320465
- Promoting breast health awareness: Can a sensor-enabled training system for patient education help? *American journal of surgery* Kearse, L., Goll, C., Wise, B., Yang, S., Mohamadipanah, H., Witt, A., Ratliff, P., Pugh, C. 2023

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• Response to: Comment on The AI and I: A Collaboration on Competence. Annals of surgery open : perspectives of surgical history, education, and clinical approaches

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- An American Board of Surgery Pilot of Video Assessment of Surgeon Technical Performance in Surgery. Annals of surgery Pryor, A. D., Lendvay, T., Jones, A., Ibáñez, B., Pugh, C. 2023
- Addressing the Surgical Workplace: An Opportunity to Create a Culture of Belonging. Annals of surgery Pugh, C. M., Kirton, O. C., Tuttle, J. E., Maier, R. V., Hu, Y., Stewart, J. H., Freischlag, J. A., Sosa, J. A., Vickers, S. M., Hawn, M. T., Eberlein, T. J., Farmer, D. L., Higgins, et al 2022
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- Benchmarking Accomplishments of Leaders in American Surgery and Justification for Enhancing Diversity and Inclusion. Annals of surgery Butler, P. D., Pugh, C. M., Meer, E. n., Lett, L. A., Tilahun, E. D., Sanfey, H. A., Berry, C. n., Stain, S. C., DeMatteo, R. P., Vickers, S. M., Britt, L. D., Martin, C. A.
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