

David Nelson Ku

Lawrence P. Huang Chair Professor for Engineering Entrepreneurship and Regents'
Professor of Mechanical Engineering

Campus Location: Parker H. Petit Institute for Bioengineering and Biosciences Building,
Room 2307; 404-894-6827

<https://www.me.gatech.edu/faculty/ku>

RESEARCH INTERESTS:

Dr. Ku's research focuses on the intersection of vascular surgery and fluid dynamics, with particular emphasis on unsteady, three-dimensional blood flow and its implications for cardiovascular health. His current work investigates the biomechanics of thrombosis, the rapid transformation of liquid blood into a solid clot under extremely high shear rates. This process is central to the onset of heart attacks and strokes, which remain the leading causes of death worldwide.

TEACHING INTERESTS:

Dr. Ku's teaching is focused on the integration of engineering principles with clinical applications, particularly in the areas of biomedical engineering, cardiovascular physiology, and fluid mechanics. His teaching interests are deeply informed by his research at the intersection of vascular surgery and fluid dynamics, with a special emphasis on unsteady, three-dimensional blood flow and its implications for human health.

EDUCATION:

M.D. in Medicine	May 1984
<i>Emory University School of Medicine</i>	<i>Atlanta, GA</i>
Ph.D. in Biofluid Dynamics	May 1983
<i>Georgia Institute of Technology</i>	<i>Atlanta, GA</i>
M.S. in Aerospace Engineering	May 1982
<i>Georgia Institute of Technology</i>	<i>Atlanta, GA</i>
B.A. in Engineering and Applied Sciences	May 1978
<i>Harvard University</i>	<i>Cambridge, MA</i>

RECENT PUBLICATIONS:

1. Robert G. Mannino, Eric J. Nehl, Sarah Farmer, Amanda Foster Peagler, Maren C. Parsell, Viviana Claveria, David Ku, David S. Gottfried, Hang Chen, Wilbur A. Lam, and Oliver Brand, “The critical role of engineering in the rapid development of COVID-19 diagnostics: Lessons from the RADx Tech Test Verification Core” *Science Advances*. 9, eade4962 (2023). DOI: 10.1126/sciadv.ade4962
2. Kim DJ, Ku DN. Material strengths of shear-induced platelet aggregation clots and coagulation clots. *Scientific Reports*. Sci Rep 14, 11460 (2024). <https://doi.org/10.1038/s41598-024-62165-1>
3. Bresette CA, Ashworth KJ, DiPaola J, Ku DN. “N-Acetyl Cysteine Prevents Arterial Thrombosis in a Dose-Dependent Manner In Vitro and in Mice” *Arterioscler Thromb Vasc Biol*. 2024;44:00–00. DOI: 10.1161/ATVBAHA.123.319044
4. Bresette CA, Shea SM, Wagoner S, Bakshi S, Deshpande SR, Maher KO, Ku, DN. "Novel Tubing Connectors Reduce ECMO Circuit Thrombosis " *The International Journal of Artificial Organs* 2024;47(5) 347-355. <https://doi.org/10.1177/03913988241252255>
5. Tolle JJ, Jadhao S, Patel B, Sun H, Eastman S, Hartert T, Ku DN, Anderson LJ, “Detection of pathogenic bacteria and biomarkers in lung specimens from cystic fibrosis patients.” *J Breath Research*, 18 (2024) 046004. doi.org/10.1088/1752-7163/ad56bc
6. Chiyaka TL, Nyawo GR, Naidoo C, Moodley S, Clemente JC, Malherbe ST, Warren R, Ku DN, Segal LN, Theron G. A novel aerosol collection method shows the cough aeromicrobiome of people with tuberculosis is phylogenetically distinct from respiratory tract specimens *Research Square* (2024) <https://doi.org/10.21203/rs.3.rs-4106141/v1>.
7. Steinberg RS, Chu TC, Shin D, Ha B, Sun HY, Jadhao SJ, Ku DN, Roberts BR, Anderson EJ, Hussaini L, Anderson LJ, Anderson B. Detection of SARS-CoV-2 RNA and biomarkers in device-captured droplets from the lung. *CHEST Pulmonary* 2025; 2025,100137, ISSN 2949-7892, <https://doi.org/10.1016/j.chpulm.2025.100137>
8. Machenaud E, Weisel JW, Litvinov RI, Nagaswami C, Ku, D. Arterial human blood flow can be stopped by cables of VWF and platelets without coagulation. *Blood Advances*. Tracking no: ADV-2025-017354R1