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Abigail Tetteh, Ph.D.

Associate | Biomedical Engineering and Sciences
Philadelphia
+1-215-594-8843 | atetteh@exponent.com

Professional Profile

Dr. Tetteh has expertise in additive manufacturing, mechanical testing, and computational modeling for orthopedic medical device applications. She has implemented fused filament fabrication (FFF) to develop spinal devices from high performance thermoplastics, evaluating the feasibility of utilizing these new generation materials through Taguchi optimization experimental design, mechanical testing, and comprehensive material characterization such as scanning electron microscopy, differential scanning calorimetry, and micro computed tomography.

In addition to her polymer research, she has contributed significantly to medical device regulatory science through her work evaluating mechanical performance variability in additively manufactured titanium alloy for orthopedic applications. This experience included mechanical testing of large sample sets through various modes, along with computational, material characterization, and chemical composition analyses. Her work supported the development of an FDA regulatory science tool.

Dr. Tetteh's expertise extends to retrieval analysis of orthopedic implants comprising conventional hip and knee devices as well as hinge knee mega-prostheses. She also has experience in developing anatomical models used as medical training tools, where she utilized 3D printing and silicone casting to fabricate liver and kidney models deployed across domestic and international clinical sites for organ perfusion training for junior surgeons. As project lead, she managed nearly all aspects of development, including CAD modeling, slicing, prototyping, silicone casting, post processing, supply research, and procurement coordination as well as trained and supervised undergraduate students supporting the mass production of these organ models.

Academic Credentials & Professional Honors

Ph.D., Biomedical Engineering, Drexel University, 2025

M.Sc., Bioengineering, Temple University, 2020

B.S., Biomedical Engineering, Kwame Nkrumah Univ of Sci and Tech, Ghana, 2017

FDA OSEL Quarterly Recognition Award, July 2023

Academic Appointments

Adjunct Instructor, College of Engineering, Temple University, January 2021 – May 2021

Graduate Teaching Assistant, Biomechanics Lab, Temple University, 2018 – 2019

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Prior Experience

Graduate Research Assistant, Implant Research Core, Drexel University, 2021 – 2025

Oak Ridge Institute for Science and Education (ORISE) Fellow, U.S. Food and Drug Administration, October 2022 – September 2023

Student Contractor – Silicone Organ Modeling, Bridge to Life & Drexel University, 2021 - 2025

Process Improvement Consultant, Duwaplus Plastics and Nourisher Foods, Ghana, January 2021 – March 2021

Biomedical Engineering Technician Intern, Mediwise Int. Company Ltd, Ghana, June 2016 – August 2016

Student Laboratory Technician Assistant, Center for Inflammatory and Lung Research, Temple University, June 2019 – August 2019

Publications

Tetteh AE, Porter D, Southern T, Campbell J, Fortune M, Di Prima M, Porter D. Use of indentation test methods for additive manufacturing build verification for Ti-6Al-4V. Journal of the Mechanical Behavior of Biomedical Materials 2026; 107507.

Tetteh AE, Kadakia J, Schwerin M, Di Prima M, Porter D. Static variability and proposed plastic material models in additively manufactured laser powder bed fusion Ti6Al4V. Journal of Materials Engineering and Performance 2026; 1–15.

Tetteh AE, Smith JA, Porter DA, Di Prima MA, Kurtz SM. Investigating the Impact of fused filament fabrication process parameters on the compressive properties of porous PEEK and PEKK biomaterials. Journal of Biomedical Materials Research Part A 114 3 (2026): e70053.

DeSantis PM, Barnes E, Tetteh AE, Smith JA, Drew M, Perine C, Kurtz SM. Additively manufactured partially porous PAEK topologies for proximal tibia revision cones and sleeves. Annals of Biomedical Engineering 2026; 1–9.

Tetteh AE, Smith JA, Spece H, Porter DA, Di Prima MA., Kurtz SM. Optimization of fused filament fabrication process parameters to improve the compressive properties of PEEK and PEKK biomaterials. Journal of the Mechanical Behavior of Biomedical Materials (2025): 107203.

Tetteh AE, Derr T, Kurtz MA, Klein GR, Piuzzi NS, Malkani A, ... Kurtz SM. Hinge-knee megaprostheses components wear and corrode: a retrospective study of 40 devices. JAAOS Global Research & Reviews 2025; e24.

Philips SP, Tetteh AE, Di Prima MA, Burchi A, Porter DA. Additive manufacturing inert gas flow path strategies for multi-laser powder bed fusion systems and their impact on lattice structure mechanical responses. 3D Printing in Medicine 2024; 10.1:11.

Phelan MA, Guha A, Harrison BK, Moukarzel G, Tetteh AE, Ochia R. Design thinking concepts in undergraduate engineering capstone projects. 2020 ASEE Virtual Annual Conference Content Access.

Conference Presentations and Posters

Tetteh AE, Porter D, Di Prima M, Kurtz S. Evaluating the static mechanical performance of fused filament fabrication anterior lumbar interbody fusion PEKK and PEEK devices. 2026 Implant Polymers: UHMWPE & PEEK Conference, Philadelphia, Pennsylvania, June 17–18, 2026.

Tetteh AE, Porter D, Di Prima M, Kurtz S. Computational modeling to assess the influence of geometric variations on the axial compressive performance of PEKK and PEEK lumbar spinal cages. 2026 Implant Polymers: UHMWPE & PEEK Conference, Philadelphia, Pennsylvania, June 17–18, 2026.

Tetteh AE, Porter D, Di Prima M, Kurtz S. Optimization of fused filament fabrication (FFF) process parameters for PEEK and PEKK biomaterials for lumbar interbody fusion devices. 2024 Implant Polymers: UHMWPE & PEEK Conference, Barcelona, Spain, June 20–21, 2024.

Porter D, Tetteh AE, Shetye S, Schwerin M, Kadakia J, Anderson J, Di Prima M. Estimating the impact of additive manufacturing material variability on medical device quasi-static performance. ASTM International Conference on Advanced Manufacturing, Washington, D.C., October 30–November 3, 2023.

Tetteh AE, Di Prima M, Shetye S, Schwerin M, Kadakia J, Porter D. Additive manufacturing variability on medical device performance; predicting static device performance with FEA. 2023 FDA Science Forum – Advancing Regulatory Science Through Innovation, Silver Spring, Maryland, June 13–14, 2023.

Tetteh AE, Derr T, MacDonald DW, Kurtz SM. Retrieval analysis of hinge-knee mega-prostheses. Poster 0632. American Academy of Orthopaedic Surgeons Annual Meeting, Chicago, IL, March 22–26, 2022.

Tetteh AE, MacDonald DW, Kurtz SM. Anisotropy in fused filament fabrication (FFF) printed FibreTuff for synthetic bone models. Orthopaedic Research Society Annual Meeting, Tampa, FL, February 2–8, 2022.

Tetteh AE, Derr T, MacDonald DW, Kurtz SM. Retrieval analysis of hinge-knee mega prostheses. Orthopaedic Research Society Annual Meeting, Tampa, FL, February 2–8, 2022.