Approved by the Regents
May 19, 2022

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Biomedical Engineering

Kelly B. Arnold, assistant professor of biomedical engineering, Department of Biomedical Engineering, College of Engineering and Medical School, is recommended for promotion to associate professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering and Medical School.

Academic Degrees:

Ph.D.	2010	University of Virginia, biomedical engineering, Charlottesville, VA
B.S.	2004	Rice University, bioengineering, Houston, TX

Professional Record:

2015 – present	Assistant Professor, Department of Biomedical Engineering, University of Michigan
2010 – 2015	Post-doctoral Fellow, Massachusetts Institute of Technology, Cambridge, MA

Summary of Evaluation:

Teaching: Professor Arnold has taught two of our core BME classes, BME 241 and BME 418. Professor Arnold took over as the primary instructor for BME 418 and introduced several changes. She was a major contributor in updating BME 241 into the new Statistics, Computation and Data Analysis class in 2021. Professor Arnold has also been a committed mentor of both undergraduate and graduate students. She has graduated one Ph.D. student with one expected to graduate this year and another four in progress. She is also active in advising M.S. and undergraduate students. Trainees in her lab characterize her as a thoughtful, empathetic, and inspiring mentor. Her graduate students have very good publication records winning several awards for presentations and posters. Her undergraduate students also report great experiences in her lab, and Professor Arnold's advice and guidance is clearly shaping their future careers.

Research: Professor Arnold's research is in the area of systems biology of immunology and infectious disease. Professor Arnold is having a pioneering influence by developing quantitative models to understand immune function in response to infectious and autoimmune diseases and by using systems biology approaches to better guide therapeutic treatment for personalized medicine. Her innovative computational methodologies are making a substantive impact in systems serology research where data-driven computational approaches are needed to identify antibody signatures associated with vaccine platforms and infectious disease. Further, her mechanistic models which integrate multiple species interactions are helping clinicians to understand how personalized differences in microbiome composition may influence antiretroviral efficacy against HIV. Importantly, her data-driven models are unraveling the progression of COPD. She has positioned herself in the field by establishing strong collaborations cohesively with both clinicians and experimentalists. Her research is well funded, and she has an impressive record of publications in top-tier journals. Her research is collaborative, and she has formed a network of scientific collaborations resulting in several co-

authored publications. She has developed a strong national reputation in her field and enjoys national and international visibility.

Recent and Significant Publications:

Lemke MM, McLean MR, Lee CY, Lopez E, Bozich ER, Rerks-Ngarm S, Pitisuttithum P, Nitayaphan S, Kratochvil S, Wines BD, Hogarth PM, Kent SJ, Chung AW, Arnold KB, "A systems approach to elucidate personalized mechanistic complexities of antibody-Fc receptor activation post-vaccination," *Cell Rep Med*, 2021 Sep 1;2(9):100386.

Selva KJ, van de Sandt CE, Lemke MM, Lee CY, Shoffner SK, Chua BY, Davis SK, Nguyen THO, Rowntree LC, Hensen L, Koutsakos M, Wong CY, Mordant F, Jackson DC, Flanagan KL, Crowe J, Tosif S, Neeland MR, Sutton P, Licciardi PV, Crawford NW, Cheng AC, Doolan DL, Amanat F, Krammer F, Chappell K, Modhiran N, Watterson D, Young P, Lee WS, Wines BD, Mark Hogarth P, Esterbauer R, Kelly HG, Tan HX, Juno JA, Wheatley AK, Kent SJ, Arnold KB, Kedzierska K, Chung AW, "Systems serology detects functionally distinct coronavirus antibody features in children and elderly," *Nat Commun*, 2021 Apr 1;12(1):2037.

Lee CY, Cheu RK, Lemke MM, Gustin AT, France MT, Hampel B, Thurman AR, Doncel GF, Ravel J, Klatt NR, Arnold KB, "Quantitative modeling predicts mechanistic links between pre-treatment microbiome composition and metronidazole efficacy in bacterial vaginosis," *Nat Commun*, 2020 Dec 1;11(1):6147.

Norman KC, O'Dwyer DN, Salisbury ML, DiLillo KM, Lama VN, Xia M, Gurczynski SJ, White ES, Flaherty KR, Martinez FJ, Murray S, Moore BB, Arnold KB, "Identification of a unique temporal signature in blood and BAL associated with IPF progression," *Sci Rep*, 2020 Jul 21;10(1):12049.

O'Dwyer DN, Norman KC, Xia M, Huang Y, Gurczynski SJ, Ashley SL, White ES, Flaherty KR, Martinez FJ, Murray S, Noth I, Arnold KB, Moore BB, "The peripheral blood proteome signature of idiopathic pulmonary fibrosis is distinct from normal and is associated with novel immunological processes," *Sci Rep*, 2017 Apr 25;7:46560.

Service: Professor Arnold has made significant contributions in the area of service. She has served as a member of the BME Graduate Admissions Committee since 2016 and has organized the BME seminar series since 2015. She has been active in undergraduate curriculum development around coursework in biocomputation, an increasingly important area in the BME field at large. Professor Arnold's external service includes serving as a reviewer, ad hoc study section member, session chair at national meetings, and new service on an editorial board which appropriately reflects her growing stature in the field. Professor Arnold also pursues opportunities to increase inclusion in STEM by her involvement in many on-campus service and learning activities and a new collaboration with the Henry Ford Community College.

External Reviewers:

Reviewer A: "She has demonstrated success in mentoring, teaching, and service to the institution and the field of BME. I believe Dr. Arnold is in an exciting position, and that the BME community will continue to benefit from her ongoing contributions."

Reviewer B: "The contributions in teaching, scholarly impact, research productivity, visibility in the field, and service activities establish Dr. Arnold as a rising star in the field of systems immunology."

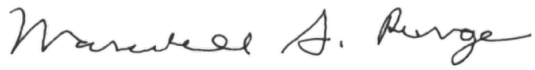
Reviewer C: "Many of her studies blend computational analysis with laboratory experiments or clinical samples – from personal experience I know that this kind of approach takes substantial effort to get set up and start to see results from. ... I am confident that she would merit tenure at [my institution] and I support her promotion at the University of Michigan."

Reviewer D: "You can see throughout her work as a postdoc and as an independent faculty member the great collaborative teams she has assembled and led to accomplish really great work."

Reviewer E: "…I believe that Dr. Arnold has already gained visibility in her field and is on a strongly upward trajectory...I look forward to seeing her future contributions to the field."

Summary of Recommendation: Professor Arnold's research has had a significant impact and is of high quality. She is an outstanding mentor and teacher, and she has performed exemplary service. It is with support of the College of Engineering Executive Committee that I recommend Kelly B. Arnold for promotion to associate professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering and Medical School.

Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering



Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

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