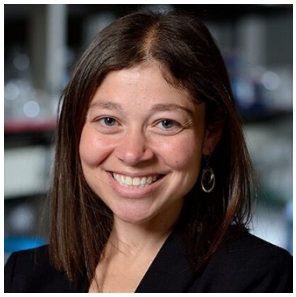

Jamie Spangler, Ph.D.

Titles & Department

Assistant Professor of Biomedical Engineering and Chemical & Biomolecular Engineering

Specialization Area

Protein engineering.

Unmet Need

Implementing unique structure-based engineering approaches to elucidate the determinants of protein activity and inform drug development.

Summary of Research & Work

The Spangler laboratory focuses on the creation of novel protein therapeutics by integrating cutting-edge techniques in structural biophysics, biomolecular engineering, and translational immunology. The objectives of this interdisciplinary program are to gain a deeper understanding of protein behavior and to explore the extent to which it can be manipulated to create therapeutics for the targeted treatment of cancer, infectious diseases, and autoimmune disorders. Her most recent high-impact paper described a novel computational strategy for the generation of protein mimetics of cytokines (e.g., IL-2 and IL-15) that replicate the binding sites important for biological activity, but with no other topological or sequence similarities (Silva et al., 2019). This platform could be applied to generate novel protein-based therapeutics for a variety of indications.

Value Proposition

- Proprietary protein engineering platform allows for the redesign of naturally occurring proteins to create novel molecules that overcome the deficiencies of existing therapeutics.
- These molecules can be used to guide immune cell behavior for targeted treatment of cancer, infectious diseases, and autoimmune disorders.
- Versatile platform also allows for the development of complex glycoproteins, including therapeutic antibodies.
- Techniques shorten biologics discovery process, expediting transition from bench to pre-clinical animal studies.

Recent Publications

- Quijano-Rubio A, Bhuiyan AM, Yang H, Leung I, Bello E, Ali LR, Zhangxu K, Perkins J, Chun JH, Wang W, Lajoie MJ, Ravichandran R, Kuo YH, Dougan SK, Riddell SR, Spangler JB, Dougan M, Silva DA, Baker D. A split, conditionally active mimetic of IL-2 reduces the toxicity of systemic cytokine therapy. Nat Biotechnol. 2022 Oct 31. doi: 10.1038/s41587-022-01510-z. Epub ahead of print. PMID: 36316485.

- VanDyke D, Iglesias M, Tomala J, Young A, Smith J, Perry JA, Gebara E, Cross AR, Cheung LS, Dykema AG, Orcutt-Jahns BT, Henclová T, Golias J, Balolong J, Tomasovic LM, Funda D, Meyer AS, Pardoll DM, Hester J, Issa F, Hunter CA, Anderson MS, Bluestone JA, Raimondi G, Spangler JB. Engineered human cytokine/antibody fusion proteins expand regulatory T cells and confer autoimmune disease protection. Cell Rep. 2022 Oct 18;41(3):111478. doi: 10.1016/j.celrep.2022.111478. PMID: 36261022; PMCID: PMC9631798.
- Ludwig SD, Bernstein ZJ, Agatemor C, Dammen-Brower K, Ruffolo J, Rosas JM, Post JD, Cole RN, Yarema KJ, Spangler JB. A versatile design platform for glycoengineering therapeutic antibodies. MAbs. 2022 Jan-Dec;14(1):2095704. doi: 10.1080/19420862.2022.2095704. PMID: 35815437; PMCID: PMC9272841.
- Silva DA, Yu S, Ulge UY, Spangler JB, Jude KM, Labão-Almeida C, Ali LR, Quijano-Rubio A, Ruterbusch M, Leung I, Biary T, Crowley SJ, Marcos E, Walkey CD, Weitzner BD, Pardo-Avila F, Castellanos J, Carter L, Stewart L, Riddell SR, Pepper M, Bernardes GJL, Dougan M, Garcia KC, Baker D. De novo design of potent and selective mimics of IL-2 and IL-15. Nature. 2019 Jan;565(7738):186-191. doi: 10.1038/s41586-018-0830-7. Epub 2019 Jan 9. PMID: 30626941; PMCID: PMC6521699.
- Spangler JB, Tomala J, Luca VC, Jude KM, Dong S, Ring AM, Votavova P, Pepper M, Kovar M, Garcia KC. Antibodies to Interleukin-2 Elicit Selective T Cell Subset Potentiation through Distinct Conformational Mechanisms. Immunity. 2015 May 19;42(5):815-25. doi: 10.1016/j.immuni.2015.04.015. PMID: 25992858; PMCID: PMC4439582.

Awards & Honors

- 2022 National Science Foundation's Early CAREER Award
- 2022 Maryland Outstanding Young Engineer
- 2021 Brody Faculty Scholar
- 2020 Johns Hopkins Catalyst Award