

Nicholas Stephanopoulos

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The Biodesign Institute (Room A120B)

Arizona State University

1001 S. McAllister Ave., Tempe, AZ 85281

EMPLOYMENT

Arizona State University, Tempe

2015 - present

Associate Professor (with tenure): School of Molecular Sciences

Associate Director: The Biodesign Institute Center for Molecular Design and Biomimetics

Graduate Faculty: Biomedical Engineering (SBHSE)

Graduate Faculty: Chemical Engineering (SEMTE)

Associate Faculty: Center for Sustainable Macromolecular Materials and Manufacturing (SM3)

Affiliate Faculty: The Biomimicry Center

Affiliate Faculty: The Global Security Initiative (GSI)

Research interests: Protein/peptide-DNA nanomaterials via self-assembly, with applications in biology, medicine, energy, engineering, and nano-robotics

Google Scholar profile: <https://scholar.google.com/citations?user=1n9zJi8AAAAJ&hl=en>

EDUCATION AND TRAINING

Northwestern University, Chicago

2011 - 2015

Postdoctoral research

Simpson Querrey Institute for BioNanotechnology (SQI)

Advisor: Prof. Samuel I. Stupp

Research focus: Self-assembling peptide and peptide-DNA biomaterials

University of California, Berkeley

2005 - 2010

Ph.D. in Chemistry (2010)

Thesis advisor: Prof. Matthew B. Francis

Dissertation title: "Integrated Nanosystems Templated
by Self-assembled Virus Capsids"

GPA: 4.0/4.0

Massachusetts Institute of Technology

2004 - 2005

Master of Science in Chemical Engineering Practice, MSCEP (2007)

GPA: 3.9/4.0

Harvard University

2000 - 2004

A.B. in Chemistry, *summa cum laude* (2004)

Research advisor: Prof. Xiaowei Zhuang

GPA: 3.9/4.0

AWARDS AND HONORS

- **2023:** Appointed Associate Director of the Center for Molecular Design and Biomimetics at ASU
- **2018:** NIH Director's New Innovator Award
- **2018:** NSF CAREER Award
- **2018:** Selected as Scialog Fellow (Research Corporation for Science Advancement and the Gordon and Betty Moore Foundation)

- **2017:** Elsa U. Pardee Foundation Award for Cancer Research
- **2016:** Air Force Office of Scientific Research (AFOSR) Young Investigator Program Award
- **2012:** NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship
- **2011:** International Institute for Nanotechnology (IIN) Postdoctoral Fellowship at Northwestern
- **2008:** Teaching Effectiveness Award. One of only seven teaching assistants honored.
- **2008:** Outstanding Graduate Student Instructor Award (awarded to top 10% of GSI's), UC Berkeley
- **2007:** J. Edward Vivian Award for exemplary performance at the MIT Practice School
- **2004:** Graduated *summa cum laude* (top 4% of class) from Harvard University
- **2004:** Elected to the Phi Beta Kappa Society, Harvard University
- **2001-2003:** Earned prizes each year (Detur Book Prize, Harvard College Prize, John Harvard Prize) for being in top 10% of class, Harvard University

PUBLICATIONS

INDEPENDENT CAREER (* = CORRESPONDING AUTHOR)

- 69) A. Gonzalez-Estrada*, K. Iijima, A.M. Richards, R.J. Estrada-Mendizabal, M.Y. Masuda, M. Matsunaga, **N. Stephanopoulos**, H. Kita, "A novel mast cell-dependent mouse model of cefazolin-induced anaphylaxis using a cefazolin-self-protein conjugate" (*manuscript in preparation*)
- 68) A. Prasad, U. Garai, D. Satyabola, S. Chowdury, A. Novacek, H. Yan, **N. Stephanopoulos***, "Light-mediated ultrafast crosslinking of self-assembled peptide-DNA block copolymers" (*manuscript in preparation*)
- 67) A. Novacek, B. Ugaz, U. Garai, **N. Stephanopoulos***, "Site-specific modification of synthetic peptides with two orthogonal DNA handles" (*manuscript in preparation*)
- 66) M. Knappenberger[‡], S.J.W. Henry[‡], A. Kikla[‡], M. Sample, O. Roy, E. Poppleton, **N. Stephanopoulos**, M. Gustafsson*, K.S. Anderson*, P. Sulc*, "Engineered mRNA nanostructures expand the design space of mRNA therapeutics through programmable protein expression and immune stimulation" (*manuscript in preparation*; [‡] co-first authors)
- 65) R. Zheng[‡], Y. Xu[‡], A. Prasad[‡], M. Liu, J. Jiang, Z. Wang, X. Zhou, R.M. Porter, M. Sample, E. Poppleton, J. Procyk, H. Liu, A. Doherty, P. Nyaupane, Y. Li, S. Wang, H. Yan*, P. Sulc*, **N. Stephanopoulos***, "IgG-inspired, multivalent protein-DNA nanostructures for high-affinity, tunable, and reversible binding to biomolecular targets" (*in revision*; [‡] co-first authors)
- pre-print available on bioRxiv:** <https://doi.org/10.1101/2023.09.18.558353>
- 64) J.A. Lewis, R. Freeman, T.D. Clemons, J.M. Godbe, **N. Stephanopoulos**, S.I. Stupp*, "Nonionic peptide amphiphiles and their supramolecular co-assemblies to tune charge density" *J. Mater. Chem. B* **2026**, *14*, 6252–6261.
- 63) P. Elblova, J. Anthi, M. Liu, M. Lunova, M. Jirsa, **N. Stephanopoulos***, O. Lunov*, "DNA Nanostructures for Rational Regulation of Cellular Organelles" *JACS Au* **2025**, *5*, 1591-1616.
- 62) L. Reyes, L. Naser, W.S. Weiner, D. Thifault, E. Stahl, L. McCreary, R. Nott, C. Quick, A. Buchberger, C. Alvarado, A. Rivera, J.A. Miller, R. Khatiwala, B.R. Cherry, R. Nelson, J.M. Garcia, **N. Stephanopoulos**, R. Fromme, P. Fromme, W. Cance, T. Marlowe*, "Structure-based discovery of hydrocarbon-stapled paxillin peptides that block FAK scaffolding in cancer" *Nat. Commun.* **2025**, *16*, 2060.
- 61) P. Elblova, H. Andelova, M. Lunova, J. Anthi, S.J.W. Henry, X. Tu, A. Dejneka, M. Jirsa, **N. Stephanopoulos***, and O. Lunov*, "Geometrically constrained cytoskeletal reorganization modulates DNA nanostructures uptake" *J. Mater. Chem. B* **2025**, *13*, 2335-2351.
- 60) D. Bukharina, K. Cauffiel, L.M. Killingsworth, J. Brackenridge, V. Poliukhova, M. Kim, J. Brower, J. Bernal-Chanchavac, **N. Stephanopoulos**, V.V. Tsukruk*, "Click chemistry-enabled functionalization of cellulose nanocrystals with single-stranded DNA for directed assembly" *ACS Biomater. Sci. Eng.* **2024**, *10*, 6155–6166.
- 59) P. Elblova, M. Lunova, S.J.W. Henry, X. Tu, A. Cale, A. Dejneka, J. Havelkova, Y. Petrenko, M. Jirsa, **N. Stephanopoulos***, and O. Lunov* "Peptide-coated DNA Nanostructures as a Platform for Control of Lysosomal Function in Cells" *Chem. Eng. J.* **2024**, *485*, 155633.

- 58) A. Novacek, B. Ugaz, **N. Stephanopoulos***, “Templating peptide chemistry with nucleic acids: towards artificial ribosomes, cell-specific therapeutics, and novel protein-mimetic architectures” *Biomacromolecules* **2024**, *25*, 3865–3876.
- 57) H. Liu, M. Matthies, J. Russo, L. Rovigatti, R.P. Narayanan, T. Diep, D. McKeen, O. Gang, **N. Stephanopoulos**, F. Sciortino, H. Yan, F. Romano, P. Sulc*, “Inverse design of a pyrochlore lattice of DNA origami through model-driven experiments” *Science* **2024**, *384*, 776-781.
- 56) T. Teng, J. Bernal-Chanchavac, **N. Stephanopoulos**, C. Castro*, “Construction of reconfigurable and polymorphic DNA origami assemblies with coiled-coil patches and patterns” *Adv. Sci.* **2024**, *11*, 2307257.
- 55) Q. Lu, Y. Xu, E. Poppleton, K. Zhou, P. Sulc, **N. Stephanopoulos***, Y. Ke*, “DNA-Nanostructure-Guided Assembly of Proteins into Programmable Shapes” *Nano Lett.* **2024**, *24*, 1703-1709.
- 54) F.M. Fumasi, T. MacCulloch, J. Bernal-Chanchavac, **N. Stephanopoulos**, J.L. Holloway*, “Using dynamic biomaterials to study the temporal role of bioactive peptides during osteogenesis” *Biomater. Adv.* **2024**, *157*, 213726.
- 53) R.P. Narayanan, A. Prasad, A. Buchberger, L. Zou, J. Bernal-Chanchavac, T. MacCulloch, N.E. Fahmi, H. Yan, F. Zhang M.J. Webber*, **N. Stephanopoulos***, “High-affinity host–guest recognition for efficient assembly and enzymatic responsiveness of DNA nanostructures” *Small* **2023**, *20*, 2307585.
- 52) L. Yu, Y. Xu, M. Al-Amin, S. Jiang, M. Sample, A. Prasad, **N. Stephanopoulos**, P. Sulc, H. Yan*, “CytoDirect: a DNA nanodevice for specific and efficient delivery of functional payloads to the cytoplasm” *J. Am. Chem. Soc.* **2023**, *145*, 27336–27347.
- 51) C.R. Simmons, A. Buchberger, S.J.W. Henry, A. Novacek, N.E. Fahmi, T. MacCulloch, **N. Stephanopoulos***, H. Yan*, “Site-specific arrangement and structure determination of minor groove binding molecules in self-assembled three-dimensional DNA crystals” *J. Am. Chem. Soc.* **2023**, *145*, 26075–26085.
- 50) Y.-Y. Hsu, S.J. Chen, J. Bernal-Chanchavac, B. Sharma, H. Moghimianavval, **N. Stephanopoulos**, and A.P. Liu*, “Calcium-triggered DNA-mediated membrane fusion in synthetic cells” *Chem. Commun.* **2023**, *59*, 8806-8809.
- 49) A. Buchberger, M. Al-Amin, C.R. Simmons, **N. Stephanopoulos***, “Self-assembly of hybrid peptide-DNA nanostructures using homotrimeric coiled-coil/nucleic acid building blocks” *ChemBioChem* **2023**, *17*, e202300223. (Featured cover article)
- 48) Z. Zhang, J. Sponer, G. Bussi, V. Mlynsky, P. Sulc, C.R. Simmons, **N. Stephanopoulos**, M. Krepl*, “Atomistic picture of opening–closing dynamics of DNA Holliday junction obtained by molecular simulations” *J. Chem. Inf. Model.* **2023**, *63*, 2794-2809.
- 47) **N. Stephanopoulos***, R. Freeman, H. Yan, “Self-Assembling Biomaterials from Proteins, Peptides, and DNA” *ACS ACS Appl. Bio Mater.* **2022**, *5*, 4579-4580. (Guest Editor editorial for special issue)
- 46) A. Buchberger[‡], K. Riker[‡], J. Bernal-Chanchavac, R.P. Narayanan, C.R. Simmons, N.E. Fahmi, R. Freeman*, **N. Stephanopoulos***, “Bioactive Fibronectin-III₁₀-DNA Origami Nanofibers Promote Cell Adhesion and Spreading” *ACS Appl. Bio Mater.* **2022**, *5*, 4625-4634. (‡ co-first authors)
- 45) R.P. Narayanan[‡], J. Procyk[‡], P. Nandi[§], A. Prasad[§], Y. Xu[§], E. Poppleton, D. Williams, F. Zhang, H. Yan, P.-L. Chiu*, **N. Stephanopoulos***, P. Sulc*, “Coarse-grained simulations for the characterization and optimization of hybrid protein-DNA nanostructures” *ACS Nano* **2022**, *16*, 14086–14096. (‡ co-first authors; § co-second authors)
- 44) B.I. Martinez, G.A. Mousa, K. Fleck, T. MacCulloch, C.W. Diehnelt, **N. Stephanopoulos**, S.E. Stabenfeldt*, “Uncovering temporospatial sensitive TBI targeting strategies via in vivo phage display” *Sci. Adv.* **2022**, *8*, eabo5047.
- 43) A. Frtus, B. Smolkova, M. Uzhytchak, M. Lunova, M. Jirsa, S.J.W. Henry, A. Dejneka, **N. Stephanopoulos***, O. Lunov*, “The interactions between DNA nanostructures and cells: A Roadmap for Successful Applications in Biomedicine A critical overview from a cell biology perspective” *Acta Biomaterial.* **2022**, *146*, 10-22.
- 42) J. Bernal-Chanchavac[‡], M. Al-Amin[‡], **N. Stephanopoulos***, “Nanoscale structures and materials from the self-assembly of polypeptides and DNA” *Curr. Top. Med. Chem.* **2022**, *22*, 699-712.

- 41) C.R. Simmons[‡], T. MacCulloch[‡], M. Krepl, M. Matthies, A. Buchberger, I. Crawford, J. Sponer, P. Sulc, Y. Liu, **N. Stephanopoulos**^{*}, H. Yan^{*}, "The influence of Holliday junction sequence and dynamics on DNA crystal self-assembly" *Nat. Commun.* **2022**, *13*, 3112.
- 40) A.P. Liu^{*}, E. Appel, P. Ashby, B. Baker, E. Franco, L. Guo, K. Haynes, N. Joshi, A. Kloxin, P. Kouwer, J. Mittal, L. Morsut, V. Noireaux, S. Parekh, R. Schulman, S. Tang, M. Valentine, S. Vega, W. Weber, **N. Stephanopoulos**^{*}, O. Chaudhuri^{*}, "The living interface between synthetic biology and biomaterial design" *Nat. Mater.* **2022**, *21*, 390-397. (see also accompanying Editorial: <https://www.nature.com/articles/s41563-022-01234-0>)
- 39) T. MacCulloch, A. Novacek, **N. Stephanopoulos**^{*}, "Proximity-enhanced synthesis of DNA-peptide-DNA triblock molecules" *Chem. Commun.* **2022**, *58*, 4044-4047.
- 38) A. Gangrade^{*}, **N. Stephanopoulos**, D. Bhatia^{*}, "Programmable, self-assembled DNA nanodevices for cellular programming and tissue engineering" *Nanoscale*, **2021**, *13*, 16834-16846.
- 37) B. Smolkova, T. MacCulloch, T. Rockwood, M. Liu, S.J.W. Henry, A. Frtus, M. Uzhytchak, M. Lunova, M. Hof, P. Jurkiewicz, A. Dejneka, **N. Stephanopoulos**^{*}, O. Lunov^{*}, "Effect of the protein corona on endosomal escape of functionalized DNA nanostructures" *ACS Appl. Mater. Interfaces* **2021**, *13*, 46375–46390.
- 36) T. Yuan, Y. Shao, X. Zhou, Q. Liu, Z. Zhu, B. Zhou, Y. Dong, **N. Stephanopoulos**, S. Gui^{*}, H. Yan^{*}, D. Liu^{*}, "Highly permeable DNA supramolecular hydrogel promotes neurogenesis and functional recovery after completely transected spinal cord injury" *Adv. Mater.* **2021**, *33*, 2102428.
- 35) S.J.W. Henry, **N. Stephanopoulos**^{*}, "Functionalizing DNA nanostructures for therapeutic applications" *Wiley Interdiscip. Rev. Nanomed. Nanobiotechnol.* **2021**, *13*, e1729.
- 34) A. Buchberger[‡], H. Saini[‡], K.R. Eliato[‡], R. Merkley, Y. Xu, A. Zare, J. Bernal, R. Ros^{*}, M. Nikkhah^{*}, **N. Stephanopoulos**^{*}, "Reversible control of gelatin hydrogel stiffness using DNA crosslinkers" *ChemBioChem* **2021**, *22*, 1755-1760. (‡ co-first authors; selected as a "Very Important Paper" by the journal)
- 33) **N. Stephanopoulos**^{*}, P. Sulc, "DNA nanodevices as mechanical probes of protein structure and function" *Appl. Sci.* **2021**, *11*, 2802.
- 32) C.R. Simmons[‡], T. MacCulloch[‡], F. Zhang, Y. Liu, **N. Stephanopoulos**^{*}, H. Yan^{*}, "Self-Assembly of a DNA Crystal Scaffold Containing Modular Cavities for the Precise Arrangement of Macromolecules" *Angew. Chem. Int. Ed.* **2020**, *59*, 18619-18626. (‡co-first authors)
- 31) F.M. Fumasi, **N. Stephanopoulos**, J.L. Holloway^{*}, "Reversible Control of Biomaterial Properties for Dynamically Tuning Cell Behavior" *J. Appl. Polym. Sci.* **2020**, *137*, e49058.
- 30) **N. Stephanopoulos**^{*}, "Hybrid nanostructures from the self-assembly of proteins and DNA" *Chem* **2020**, *6*, 364-405.
- 29) A. Buchberger, C.R. Simmons, N.E. Fahmi, R. Freeman, **N. Stephanopoulos**^{*}, "Hierarchical assembly of nucleic acid/coiled-coil peptide nanostructures" *J. Am. Chem. Soc.* **2020**, *142*, 1406-1416. (selected as "ACS Editor's Choice" article; designated one of the most highly cited publications from 2020-2021 by JACS)
- 28) T. Mahatmanto^{*}, I. Azizah, A. Buchberger, **N. Stephanopoulos**, "Progress toward sourcing plants for new bioconjugation tools: a screening evaluation of a model peptide ligase using a synthetic precursor" *3 Biotech* **2019**, *9*, 442.
- 27) **N. Stephanopoulos**^{*}, "Peptide-DNA hybrid molecules for bioactive nanomaterials" *Bioconjugate Chem.* **2019**, *30*, 1915-1922. (selected as "ACS Editor's Choice" article)
- 26) **N. Stephanopoulos**^{*}, "Strategies for stabilizing DNA nanostructures to biological conditions" *ChemBioChem* **2019**, *20*, 2191-2197.
- 25) Y. Xu, S. Jiang, C. Simmons, R.P. Narayanan, F. Zhang, A.-M. Aziz, H. Yan, **N. Stephanopoulos**^{*}, "Tunable nanoscale cages from self-assembling DNA and protein building blocks" *ACS Nano* **2019**, *13*, 3545–3554.
- 24) A. Stelson, M. Liu, C. Little, C. Long, N. Orloff, **N. Stephanopoulos**^{*}, J. Booth^{*}, "Label-free detection of conformational changes in switchable DNA nanostructures with microwave microfluidics" *Nat. Commun.* **2019**, *10*, 1174.

- 23) T. MacCulloch[‡], A. Buchberger[‡], **N. Stephanopoulos***, “Emerging applications of peptide-oligonucleotide conjugates: bioactive scaffolds, self-assembling systems, and hybrid nanomaterials” *Org. Biomol. Chem.* **2019**, *17*, 1668-1682. (‡ co-first authors)
- 22) M. Liu, S. Jiang, O. Loza, N.E. Fahmi, P. Sulc, **N. Stephanopoulos***, “Rapid photo-actuation of a DNA nanostructure using an internal photocaged trigger strand” *Angew. Chem. Int. Ed.* **2018**, *57*, 9341-9345. (selected as paper for Wiley’s Joint Special Collection on Biopolymers, for the Murray Goodman Award Symposium at the 2019 ACS Spring Meeting: bit.ly/wileybiopolymers19)
- 21) **N. Stephanopoulos***, R. Freeman*, “DNA-based materials as self-assembling scaffolds for interfacing with cells”, “Self-Assembling Biomaterials: Molecular Design, Characterization and Application in Biology and Medicine, 1st Edition” **2018**, pp. 157-175. (Elsevier)
- 20) L. Avolio, D. Sipes, **N. Stephanopoulos**, S. Sur*, “Recreating stem-cell niches using self-assembling biomaterials”, “Self-Assembling Biomaterials: Molecular Design, Characterization and Application in Biology and Medicine, 1st Edition” **2018**, pp. 421-454. (Elsevier)
- 19) C. Simmons, F. Zhang, T. MacCulloch, N.E. Fahmi, **N. Stephanopoulos**, Y. Liu, N. Seeman, H. Yan*, “Tuning the Cavity Size and Chirality of Self-Assembling 3D DNA Crystals” *J. Am. Chem. Soc.* **2017**, *139*, 11254-11260.
- 18) D. Varun, G.R. Srinivaan, Y.-H. Tsai, H.-J. Kim, J. Cutts, F. Petty, R. Merkley, **N. Stephanopoulos**, D. Dolezalova, M. Marsala, D.A. Brafman*, “A Robust Vintronection-Derived Peptide for the Scalable Long-term Expansion and Neuronal Differentiation of Human Pluripotent Stem Cell (hPSC)-derived Neural Progenitor Cells (hNPCs)” *Acta Biomater.* **2017**, *48*, 120-130.

POSTDOCTORAL AND GRADUATE RESEARCH (* = CO-FIRST AUTHOR)

- 17) R. Freeman, M. Han, Z. Álvarez, J.A. Lewis, J.R. Wester, **N. Stephanopoulos**, M.T. McClendon, C. Lynsky, J.M. Godbe, H. Sangji, E. Luijten, S.I. Stupp, “Reversible self-assembly of superstructured networks” *Science* **2018**, *362*, 808-813.
- 16) J.J. Greene, M.T. McClendon, **N. Stephanopoulos**, Z. Alvarez, S.I. Stupp, C.-P. Richter, “Electrophysiological Assessment of a Peptide Amphiphile Nanofiber Nerve Graft for Facial Nerve Repair” *J. Tissue Eng. Regen. Med.* **2018**, *12*, 1389–1401.
- 15) A.J. Matsuoka, Z.A. Sayed, **N. Stephanopoulos**, E.J. Berns, A.R. Wadhwani, Z.D. Morrissey, D.M. Chadly, S. Kobayashi, A.N. Edelbrock, T. Mashimo, C.A. Miller, T.L. McGuire, S.I. Stupp, J.A. Kessler “Creating a stem cell niche in the inner ear using self-assembling peptide amphiphiles” *PLoS ONE* **2017**, *12*, e0190150.
- 14) R. Freeman*, **N. Stephanopoulos***, Z. Álvarez, J.A. Lewis, S. Sur, C.M. Serrano, J. Boekhoven, S.S. Lee, S.I. Stupp, “Instructing cells with programmable DNA-peptide hybrids” *Nat. Commun.* **2017**, *8*, 15982.
- 13) C. Rubert-Perez, **N. Stephanopoulos**, S.S. Lee, S. C. Newcomb, Sur, S.I. Stupp, “The Powerful Functions of Peptide-Based Bioactive Matrices for Regenerative Medicine” *Ann. Biomed. Eng.* **2015**, *43*, 501-514.
- 12) **N. Stephanopoulos**, R. Freeman, H.N. Scheler, S. Sur, S. Jeong, F. Tantakitti, J.A. Kessler, S.I. Stupp, “Bioactive DNA-Peptide Nanotubes Enhance the Differentiation of Neural Stem Cells Into Neurons” *Nano Lett.* **2015**, *15*, 603-609.
- 11) A. Li, A. Hokugo, A. Yalom, E.J. Berns, **N. Stephanopoulos**, M.T. McClendon, L.A. Segovia, I. Spigelman, S.I. Stupp, R. Jarrahy., “A bioengineered peripheral nerve construct using aligned peptide amphiphile nanofibers” *Biomaterials* **2014**, *35*, 8780-8790.
- 10) J. Sack, **N. Stephanopoulos**, D.C. Austin, M.B. Francis, J.S. Trimmer, “Antibody-guided photoablation of voltage-gated potassium channels” *J. Gen. Physiol.* **2013**, *142*, 315-324.
- 9) **N. Stephanopoulos**, J.H. Ortony, S.I. Stupp, “Self-Assembly for the Synthesis of Functional Biomaterials” *Acta Materialia* (special Diamond Jubilee Issue), **2013**, *61*, 912-930.
- 8) **N. Stephanopoulos**, M.B. Francis, “Making New Materials from Viral Capsids” “Polymer Science: A Comprehensive Reference, 1st Edition” **2012**, Vol. 9, pp. 247-266. (Elsevier)

- 7) **N. Stephanopoulos**, M.B. Francis, "Choosing an Effective Protein Bioconjugation Strategy" *Nat. Chem. Biol.* **2011**, 7, 876-884.
- 6) P.G. Holder, D.T. Finley, **N. Stephanopoulos**, R. Walton, D.S. Clark, M.B. Francis, "Dramatic Thermal Stability of Virus-Polymer Conjugates in Hydrophobic Solvents" *Langmuir* **2010**, 26, 17383–17388.
- 5) **N. Stephanopoulos**, G.J. Tong, S.C. Hsiao, M.B. Francis, "Dual-Surface Modified Virus Capsids for Targeted Delivery of Photodynamic Agents to Cancer Cells" *ACS Nano* **2010**, 4, 6014-6020.
- 4) **N. Stephanopoulos***, M. Liu*, G.J. Tong, Z. Li, Y. Liu, H. Yan, M.B. Francis, "Immobilization and One-Dimensional Arrangement of Virus Capsids with Nanoscale Precision Using DNA Origami" *Nano Lett.* **2010**, 10, 2714-2720.
- 3) R.A. Miller, **N. Stephanopoulos**, J.M. McFarland, A.S. Rosko, P.L. Geissler, M.B. Francis, "The Impact of Assembly State on the Defect Tolerance of TMV-based Light Harvesting Arrays" *J. Am. Chem. Soc.* **2010**, 132, 6068-6074.
- 2) **N. Stephanopoulos**, Z.M. Carrico, M.B. Francis, "Nanoscale Integration of Sensitizing Chromophores and Porphyrins Using Bacteriophage MS2" *Angew. Chem. Int. Ed.* **2009**, 121, 9662-9666.
- 1) **N. Stephanopoulos**, E.O.P. Solis, G. Stephanopoulos, "Nanoscale process systems engineering: Toward molecular factories, synthetic cells, and adaptive devices" *AIChE J.* **2005**, 51, 1858-1869.

INVITED CONFERENCE PRESENTATIONS AND SEMINARS

- "Hybrid nanomaterials using proteins, peptides, and DNA" University of California, Santa Barbara; March 2, 2026
- "DNA nano-scaffolds and linkers for the multivalent presentation of bioactive proteins and peptides" ACS National Meeting; August 18, 2025
- "Hierarchical Assembly of Protein-DNA and Peptide-DNA Nanomaterials" MRS National Meeting; April 9, 2025
- "Supramolecular synthesis using proteins, peptides, and DNA" Distinguished BME Seminar, Boston University; Jan. 23, 2025
- "Supramolecular synthesis of functional polypeptide-DNA nanomaterials" Karolinska Institute, Stockholm, Sweden; December 12, 2024
- "Supramolecular synthesis of functional polypeptide-DNA nanomaterials" Institute of Biophysics of the Czech Academy of Sciences (BFU), Brno, Czech Republic; July 15, 2024
- "Supramolecular synthesis of functional polypeptide-DNA nanomaterials" Institute of Physics of the Czech Academy of Sciences (FZU), Prague, Czech Republic; June 13, 2024
- "Supramolecular synthesis of functional polypeptide-DNA nanomaterials" Vienna BioCenter, Austria; June 7, 2024
- "Supramolecular polymerization of DNA-hybrid materials in one and three dimensions" ACS National Meeting; March 19, 2024
- "Supramolecular synthesis of functional polypeptide-DNA nanomaterials" ETH Zurich Department of Biosystems Science and Engineering, Basel, Switzerland; March 5, 2024
- "Hybrid, functional nanomaterials that integrate proteins/peptides and DNA" UT Austin; Feb. 8, 2024
- "Hybrid self-assembled nanomaterials from proteins, peptides, and DNA" Society for Biomaterials: Southwest Biomaterials Day; October 27, 2023
- "The Structure and Function of Hybrid Nucleic Acid-Polypeptide Nanomaterials" Gordon Research Conference on Peptide Materials; January 18, 2023
- "Hybrid self-assembled nanomaterials from proteins, peptides, and DNA" UC Merced; April 29, 2022
- "Hybrid self-assembled nanomaterials from proteins, peptides, and DNA" U. Nebraska Medical Center; March 30, 2022
- "Integrating protein and peptide self-assembly with DNA nanotechnology" APS National Meeting, Chicago IL; March 14, 2022

- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” UNSW, Sydney, Australia; *via Zoom*; Feb. 23, 2022
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” U. Michigan; Jan. 7, 2022
- “Hybrid Protein-DNA and Peptide-DNA Nanostructures” AIChE Meeting, Boston MA; November 9, 2021
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” U. Mass Amherst; Oct. 7, 2021
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Frontiers in Global Science Seminar, Royal Scientific Society of Jordan; August 10, 2021 (*via Zoom due to Covid-19 pandemic*)
- “Supramolecular polymerization of DNA origami nanostructures with peptides, proteins, and small molecules” ACS National Meeting; April 9, 2021 (*online due to Covid-19 pandemic*)
- “Hybrid nanomaterials from proteins, peptides, and DNA” Institute of Physical Chemistry at University of Hamburg, Hamburg, Germany; January 26, 2021 (*via Zoom due to Covid-19 pandemic*)
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Max Planck Institute for Polymer Research, Mainz, Germany; August 4, 2020 (*via Zoom due to Covid-19 pandemic*)
- “Protein-DNA nanotechnology” Institute for Protein Design, Seattle WA; March 12, 2020 (*via Zoom due to Covid-19 pandemic*)
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” California Institute of Technology, Pasadena CA; March 9, 2020
- “Rapid photo-actuation of a DNA nanostructure using an internal photocaged trigger strand” APS National Meeting, Denver CO; March 2, 2020 (*online due to Covid-19*)
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Technische Universität München (Technical University of Munich), Munich, Germany; January 10, 2020
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Fyzikální Ústav AV ČR, (FZU; Institute of Physics of the Czech Academy of Sciences), Prague, Czech Republic; January 7, 2020
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Wyss Institute (Harvard University), Cambridge MA; December 2, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Memorial Sloan-Kettering Cancer Center, New York NY; November 26, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Johns Hopkins University, Baltimore MD; October 31, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” University of California, San Diego, San Diego CA; October 28, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” University of North Carolina at Chapel Hill, Chapel Hill NC; October 22, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Institute for Molecular Engineering, Chicago IL; October 18, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” McGill University, Montreal Canada; October 1, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” The Ohio State University, Columbus OH; September 20, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge MA; September 13, 2019
- “Hybrid self-assembled nanomaterials from proteins, peptides, and DNA” Macromolecules Innovation Institute, Virginia Tech, Blacksburg VA; September 11, 2019
- “Hybrid peptide/protein-DNA nanomaterials for medicine and biology” 10th International Nanomedicine Conference, Sydney, Australia; June 24, 2019
- “Hybrid nanomaterials through the self-assembly of coiled-coil peptides and DNA nanostructures” ACS National Meeting, Orlando, FL; April 3, 2019
- “DNA nanoscaffolds for molecular machines, structures, and biomaterials,” ASU BME Seminar, Tempe AZ; October 12, 2018

- “Light-triggered self-assembly and actuation of DNA nanostructures using photocaged nucleotides,” ACS National Meeting, San Francisco CA; April 5, 2017
- “Peptide-DNA Hybrids for Dynamic, Programmable Control of Biomaterials,” ASU Molecular, Cellular, and Tissue Bioengineering (MCTB) Symposium, Tempe AZ; April 2, 2016
- “Instructing cells with programmable peptide-DNA extracellular matrices,” University of Science and Technology of China (USTC), Hefei, China; December 7, 2015

CURRENT AND PAST FUNDING

- **NIH 1R01AR084053-01A1** – “Designing biomaterials with temporal control of proteins via genetic fusion with coiled coil peptides for enhanced bone repair” (PI: J. Holloway; Co-I: N. Stephanopoulos): \$1,942,545 (8/1/2025 – 5/31/2030)
- **NSF BMAT** – “Self-assembled DNA crystals as scaffolds for macromolecules” (PI: H. Yan; Co-PI: N. Stephanopoulos): \$499,999 (8/1/2023 – 7/31/2026)
- **NIH 1R01GM145916-01A1** – “Multivalent protein-DNA nanostructures as synthetic blocking antibodies” (PI: N. Stephanopoulos; Co-PI: P. Sulc): \$865,062 (7/1/2023 – 6/30/2026)
- **DOD-AFOSR** – “3D Nano-printing of protein nanostructures using DNA molds” (PI: N. Stephanopoulos): \$596,691 (7/1/2021 – 6/30/2024)
- **NIH DP2 (New Innovator Award)** – “Chemical synthesis of G protein-coupled receptors using sequential DNA-templated reactions” (PI: N. Stephanopoulos): \$2,230,906 (9/30/2018 – 5/31/2023)
- **DOD-AFOSR (Young Investigator Program)** – “Peptide-DNA Tiles as Building Blocks for the Synthesis of Complex Nanostructures” (PI: N. Stephanopoulos): \$359,541 (12/1/2016 – 11/30/2019)
- **NSF CAREER** – “Hybrid protein-DNA nanostructures and devices” (PI: N. Stephanopoulos): \$539,785 (7/1/2018 – 6/30/2023)
- **NIH R21** – “DNA Hyaluronic Acid Platform for Spatiotemporally Probing the Role of Adhesion Ligands and Growth Factors” (Co-PIs: J. Holloway, N. Stephanopoulos): \$347,738 (4/1/2019 - 1/31/2021)
- **NSF BMAT** – “Rational design of self-assembled, three-dimensional DNA crystals” (PIs: H. Yan; Co-PIs: N. Stephanopoulos, P. Sulc): \$450,000 (5/1/2020 - 4/30/2023)
- **NSF Elements** – “Models and tools for on-line design and simulations for DNA and RNA Nanotechnology” (PI: P. Sulc; Co-PIs: H. Yan, N. Stephanopoulos): \$436,407 (10/1/2019 - 9/30/2022)
- **Elsa U. Pardee Foundation** – “Synthetic Peptide-DNA Antibodies for Targeting Cancer Cells” (PI: N. Stephanopoulos): \$186,374 (1/1/2018 – 12/31/2018)
- **DOD-NAVY-ONR (DURIP instrument grant)** – “Mass Spectrometry Instrument for Mass Determination of Protein and Nucleic Acid Conjugates” (PI: H. Yan; Co-PIs: N. Stephanopoulos, J. Mills): \$300,000 (8/15/2016 - 8/14/2017)

TEACHING

- **Chem 233 – General Organic Chemistry I:** I have taught this class 6 times (between 2016 and 2024)
- **Chem 598 – Supramolecular Chemistry and Self-assembly:** This is a new graduate seminar I developed, on special topics in supramolecular chemistry and self-assembly. I have taught it 7 times (between 2015 and 2025)
- **Chem 598 – Polymers are Everywhere:** This is a new graduate seminar course I developed with Profs. Tim Long and Alexandra Navrotsky (taught Spring 2025)
- **Chem 501 – Scientific Proposal Writing and Review:** This is a graduate seminar I developed on how to write scientific proposals. Students write an NIH R21 style proposal over the course of the semester; I have taught it three times (2022, 2024, and 2026)
- **Chem 433 – Advanced Organic Chemistry:** I taught this online course (spring 2023), with an emphasis on biomolecular chemistry and chemical biology.

- **Chem 333 – General Organic Chemistry I (for majors):** I created this new class in Fall 2025, as a new offering for the School of Molecular Sciences majors; it covers similar material as Chem 233, but in greater depth and sophistication

PATENTS

- **US Patent No. 11,708,594; 12,365,929** – “Reconfigurable DNA nano-tweezer”; Inventors: **N. Stephanopoulos**, M. Liu
- **US Patent No. 11,547,997** – “Integrated diagnostic devices having embedded biomolecular computing systems and uses thereof”; Inventors: A.A. Green, M. Gilliam, K. Swingle, **N. Stephanopoulos**, N. Woodbury
- **US Patent No. 11,789,029** – “Temporal Traumatic Brain Injury Biomarkers and Methods of Use Thereof”; Inventors: B. Martinez, S. Stabenfeldt, C. Diehnelt, **N. Stephanopoulos**, C. Willingham, A. Witten, K. Lundgreen
- **US Patent No. 11,814,659; 12,365,889** – “Tunable Nanoscale Cages from Self-Assembling DNA and Protein Building Blocks”; Inventors: **N. Stephanopoulos**, Y. Xu
- **US patent No. 12,673,115** – “Nucleic Acid-Peptide-Nucleic Acid Conjugate Molecules and Methods of Making the Same”; Inventors: N. Stephanopoulos, T. MacCulloch

MENTORING

POSTDOCTORAL SCHOLARS & RESEARCH SCIENTISTS

- Dr. Minghui Liu (current Research Assistant Professor in group)
- Dr. Judita Anthi (Marie Curie Fellowship)
- Dr. Yang Xu (former Research Assistant Professor; co-advised with Prof. Hao Yan)
- Dr. Nour Eddine Fahmi (former Research Scientist; co-advised with Prof. Hao Yan)

GRADUATE STUDENTS

- Tara MacCulloch (PhD, currently at Takeda Pharmaceuticals: <https://www.takeda.com/>)
- Alex Buchberger (PhD, currently at Nimble Therapeutics: <https://nimbletherapeutics.com/>)
- Raghu Pradeep Narayanan (PhD; co-advised with Prof. Hao Yan, currently postdoc at UCSF)
- Jonah Procyk (PhD; co-advised with Prof. Petr Šulc, currently at Novateur Research Solutions)
- Skylar Henry (PhD; co-advised with Prof. Karen Anderson, currently postdoc at Heath Futures Center)
 - Harry Lowell Swift Advancing Health Scholarship
- Julio Bernal (PhD; currently postdoc at UC Berkeley)
 - 2023 Stanford PRISM award
 - California Institute for Regenerative Medicine (CIRM) Fellowship
- Md Al-Amin (PhD)
- Alexandra Novacek (PhD)
 - ASU Graduate College Focus on Finishing Your Degree Award
 - Summer Completion Fellowship from ASU
 - Outstanding Graduate Student Merit Award
- Paul Workinger (joint PhD program with Caris Life Sciences)
- Abhay Prasad (co-advised with Prof. Hao Yan)
 - ASU Graduate College Focus on Finishing Your Degree Award
 - Outstanding Graduate Research Assistant Award
 - Harry Lowell Swift Advancing Health Scholarship
- Xinyi Yu (co-advised with Prof. Hao Yan)
 - PhRMA Foundation Predoctoral Fellowship
 - Outstanding Graduate Research Assistant Award
 - Outstanding Teaching Assistant Award

- Rong Zheng (co-advised with Prof. Hao Yan)
 - Outstanding Graduate Student Merit Award
 - Outstanding Graduate Research Assistant Award
 - Harry Lowell Swift Advancing Health Scholarship
- Justin Brower
 - Outstanding Graduate Student Merit Award
 - ASCEND^R Fellowship
- Anna Holland
 - Awarded the NIH T32 RESTEP Fellowship
- Udbhas Garai

MASTERS STUDENTS

- Ryan Merkley (graduated 2016)
- Ann-Marie Aziz (graduated 2017)
- Timothy Griswold (graduated 2018)
- Omar Loza (graduated 2018)
- Brittany Torczynski (graduated 2019)
- Tyler Rockwood (graduated 2020)
- Karen Baker (graduated 2024)
- Charitha Rajapakse (graduated 2025)
- Bryan Ugaz (co-advised with Prof. Jeremy Mils; graduated 2025)
 - 2023 NSF GRFP Award
 - Outstanding Graduate Student Merit Award
- John Shih (graduated 2026)
- Bryan Le (graduated 2026)

UNDERGRADUATE STUDENTS

- Brittany Torczynski (stayed in lab for Masters)
- Will Tuli
- Matthew Nam
- Omar Loza (stayed in lab for Masters)
- Jonah Procyk (stayed in lab for PhD)
- Ilyssa Farmer
- Tyler Rockwood (stayed in lab for Masters)
- Rifat Adam Akkad
- Grant Severson
- Colton Seever
- Jessica Guido
- Anna Hostal
- Brooke Lovell
- Yash Gamoth
- Kaityln Cribbs
- Leif Lindberg
- Jonathan Chapman
- Eva Chen (awarded Dean's Medal by SMS)
- Justin Brower (stayed in lab for PhD)
- Tejrit Miryala
- John Shin (stayed in lab for Master's)
- Bryan Le (stayed in lab for Master's)
- Vu Mai Thy Nguyen
- Adam Doherty
- Kiara Mendez
- Pranish Nyaupane

- Saaj Chowdhury

PHD COMMITTEE MEMBER

- Abhishek Debnath
- Swarup Dey
- Patrick Gleason
- Lan Zhu
- Soma Chaudhary
- Sanchari Saha
- Pritha Bisarad
- Subhadeep Dutta
- Towshif Rabbani
- Chang Liu
- Mahasish Shome
- Zina Al-Sahouri
- Roslyn Dermody (School of Life Sciences)
- Zaoqing Yan
- Justus Nwachukwu
- Thai Pham
- Fallon Fumasi (SEMTE, Chemical Engineering)
- Raymond Tindell (SEMTE, Chemical Engineering)
- Griffin McCutcheon
- Leeza Abraham
- Xiaoyu Chen
- Lu Yu
- Liangxiao Chen
- David Prieto (SBHSE, Biomedical Engineering)
- Yue Tang
- Erik Poppleton (SBHSE, Biological Design Program)
- Deeksha Satyabola
- Madeleine King
- Halima Khatun
- Lanshen Zhao
- Thong Diep
- Roman Fabry
- Souvik Poddar
- Olivia Roy
- Khushi Garg
- Nishinki Thakshana Muthumuni
- Ciara Eades (SBHSE)
- Gengshi Wu
- Archana Kikla
- Subhajit Roy (Physics)
- Matthew Sample (Biological Design)
- Carol Lu

SERVICE AND OUTREACH ACTIVITIES

- Have served as reviewer for the following journals: *Nature*, *Nature Communications*, *Journal of the American Chemical Society*, *Biomacromolecules*, *Acta Biomaterialia*, *Nano Research*, *Nanoscale ACS Applied Materials & Interfaces*, *Nucleic Acids Research*, *Trends in Biochemical Sciences*, *Science Advances*, *Chem, Matter*, *Accounts of Chemical Research*, *Angewandte Chemie*, *International Journal of Molecular Sciences*,

Chemical Communications, Bioconjugate Chemistry, Scientific Reports, ACS Nano, Small, ChemBioChem, Trends in Biotechnology, Advanced Materials, Langmuir, Advanced Science, Chemistry – A European Journal; served as reviewer for an Elsevier textbook proposal on self-assembled materials and a book chapter for the Karty organic chemistry textbook.

- Chaired the “Molecular, Cellular, and Tissue Bioengineering Symposium”, a meeting at ASU covering various aspects of bioengineering, with speakers from both within and outside the university. My co-chair (Prof. Julianne Holloway) and I expanded the symposium from one day to two, and had ~100 students, postdocs, and faculty attendees
- Served on Committee for Undergraduate Education and Awards (since Fall 2016)
- Traveled to China for two weeks (Dec. 2015) to recruit talented students from top universities for the SMS PhD program. Made 20 offers, 5 of which were accepted
- Participated in Association of College and University Educators (ACUE) pilot program (Fall 2016) for more effective teaching techniques; one of two SMS representatives (and only junior faculty) chosen to evaluate the effectiveness of this program for future SMS participation
- Served on Served on Goldwater Scholarship selection committee (Fall 2018)
- Served on departmental search committees for ASU:
 - Junior faculty candidate for bioengineering (SBHSE); Spring 2018
 - Junior faculty candidate in Chemical Engineering for SEMTE; Spring 2018
 - Senior faculty candidate for Director for the School of Molecular Sciences; Spring 2020
 - Junior faculty candidate for chemistry and biochemistry (SMS); Spring 2023
 - Junior faculty candidate for chemical engineering (SEMTE); Spring 2023
 - Lecturer in organic chemistry (SMS); Spring 2023
- Initiated outreach with Kyrene del Pueblo Middle School (Chandler) and taught basic concepts of DNA nanotechnology to 8th grade science class
- Working with Ask A Biologist initiative at ASU (<https://askabiologist.asu.edu/>) to develop an interactive game for K-12 students on DNA self-assembly, with concomitant teacher training workshop
- Volunteered as judge for the Intel Science and Engineering Fair (ISEF) in Phoenix (May 2016)
- Served as School of Molecular Sciences liaison to Regenerative Medicine Core at ASU (2020-2021)
- Served on grant review panels and forward-looking workshops:
 - NSF FDA panel (July 2018)
 - Ad hoc review for NSF FDA (July 2019)
 - NSF Square Table 2 workshop on the interface between synthetic biology and biomaterials science (Oct. 2019)
 - ARPA-E workshop (Dec. 2019)
 - Reviewed proposal for AFOSR Young Investigator Program (Aug. 2020)
 - Reviewed for DOE Biomolecular Materials Program (Feb. 2021)
 - Reviewed for the NSF DMR Program (March 2022)
 - Served on the NIH EBIT Study Section (June 2023)
 - Served on the NIH BBMT-M Study Section (Nov. 2023)
 - Served as ad hoc reviewer for the NSF BMAT Program CAREER (Oct. 2024)
 - Reviewed for DOE Biomolecular Materials Program (Jan. 2025)
 - Served on the NIH Chemistry, Biochemistry and Biophysics A Study Section (July 2025)
 - Served as a reviewer for the Natural Sciences and Engineering Research Council of Canada (NSERC; December 2025)
 - Served as a reviewer for the European Research Council (ERC) Advanced Grant Call (December 2025)
- Served as member of ASU’s Biological Design Graduate Program Steering Committee (from Fall 2020)
- Served as faculty advisor for HOSA – Future Health Professionals (from Fall 2020)
- Served as External Examiner for McGill Chemistry PhD thesis defense
- Served as External Examiner for FZU (Institute of Physics of the Czech Academy of Sciences) PhD thesis

- Guest Editor for special issue of *ACS Applied Bio Materials* (co-editor: Prof. Ronit Freeman), focusing on self-assembled peptide, protein, and DNA biomaterials
- Created new Junior Faculty Mentoring program for School of Molecular Sciences
- Served as External “Opponent” for PhD thesis defense at the Karolinska Institute, Stockholm, Sweden (Dec. 2024)
- Invited as External “Opponent” for PhD thesis defense at Aalto University, Helsinki, Finland (planned for June 2025)
- Served on the School of Molecular Science’s Self-Study Committee (2025-2026) for the Academic Program Review, held every 7 years
- Served as SMS representative on ASU’s The College Research Council (from Fall 2025)
- Served as the SMS representative on ASU’s Regenerative Engineering, Science, and Technology Education Program (RESTEP; an NIH T32 predoctoral training grant) steering committee