

Aditya M. Kunjapur
Assistant Professor
Chemical and Biomolecular Engineering
University of Delaware

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Education

- 2015 - 2018 Post-Doctoral Research Fellow, Genetics, Harvard Medical School
Advisor: Prof. George M. Church
- 2010 - 2015 Ph.D., Chemical Engineering, Massachusetts Institute of Technology (MIT)
Advisor: Prof. Kristala L. J. Prather
- 2006 - 2010 B.S., Chemical Engineering, University of Texas at Austin (UT)
Minor: Business Foundations (MAN, MKT, FIN, LEB, ACC, MIS, ECO, SDS)

Professional Experience

- 2019 Assistant Professor, Chemical and Biomolecular Engineering, University of Delaware
- 2016 Consultant, EnEvolv
- 2013 Intern Associate, Terawatt Ventures
- 2009, 2010 Intern, Shell Upstream Americas
- 2009 Intern, Shell Upstream Americas
- 2008 Intern, ExxonMobil Production
- 2006, 2007 Intern, Shell Exploration & Production (2 summers)

Teaching Experience

- 2013 Teaching Assistant (TA), Graduate Kinetics and Reactor Design, MIT Chemical Engineering
- 2011, 2012 Co-teacher, "Microbial Chemical Factories", MIT Educational Studies Program
- 2011, 2012 Co-TA, "Fermentation Tech." & "Downstream Processing", MIT Short Courses
- 2009 TA, Material and Energy Balances, UT Chemical Engineering
- 2008 - 2009 Tutor and Grader, Transport Phenomena, UT Chemical Engineering

Selected Awards

- 2019 Emerging Leaders in Biosecurity Initiative Fellow
- 2017 Synthetic Biology (SB7.0) Biosecurity Fellow
- 2014 American Institute of Chemical Engineers (AIChE) Entrepreneurship & Creativity Workshop Participant
- 2014 Synthetic Biology Engineering Research Center (SynBERC) Oral Presentation Awardee
- 2013 BIOPRO World Talent Campus Participant
- 2011 National NSF ERC Elevator Pitch 3rd Place Awardee
- 2010 National Science Foundation Graduate Research Fellow
- 2010 Chevron-MIT Energy Initiative Fellow
- 2010 National Tau Beta Pi Williams Fellow
- 2009 University of Texas Unrestricted Endowed Presidential Scholar
- 2007 Shell Oil Company Technical Scholar
- 2006 Micron Science and Technology Scholar
- 2006 Texas Society of Professional Engineers Chapter and State Awards

Peer Reviewed Publications

(† denotes equal contributions, * denotes corresponding)

ORCID: 0000-0001-6869-9530

Before appointment at the University of Delaware:

12. Kunjapur, A.M.†*; Pflingst, P.†; Thompson, N.C.* “Gene synthesis allows biologists to source genes from farther away in the tree of life.” *Nat. Commun.* **2018** 9, 4425. DOI: 10.1038/s41467-018-06798-7.
11. Wannier, T.M.†*; Kunjapur, A.M.†*; Rice, D.P.; McDonald, M.J.; Desai, M.M.; Church, G.M. “Adaptive evolution of genomically recoded *Escherichia coli*.” *Proc. Natl. Acad. Sci. U.S.A.* **2018** 115 (12), 3090-3095. DOI: 10.1073/pnas.1715530115. (Highlighted by *HMS News* and by *PNAS*)
10. Kohman, R.†; Kunjapur, A.M.†; Hysolli, E.†; Wang, Y.†; Church, G.M. “From designing the molecules of life to designing life: future applications derived from advances in DNA technologies.” *Angew. Chem. Int. Ed.* **2018** 57 (16), 4313-4328. DOI: 10.1002/anie.201707976.
09. Kunjapur, A.M.*; Stork, D.A.; Kuru, E.; Vargas-Rodriguez, O.; Landon, M.M.; Söll, D*.; Church, G.M.* “Engineering post-translational proofreading to discriminate non-standard amino acids.” *Proc. Natl. Acad. Sci. U.S.A.* **2018** 115 (3) 619-624. DOI: 10.1073/pnas.1715137115. (Highlighted by *HMS News*)
08. Khlystov, N.A.†; Chan, W.Y.†; Kunjapur, A.M.; Shi, W.; Prather, K.L.J.; Olsen, B.D. “Material properties of the cyanobacterial reserve polymer multi-L-arginyl-poly-L-aspartate (cyanophycin).” *Polymer.* **2017** 109 (1), 238-245. DOI: 10.1016/j.polymer.2016.11.058.
07. Kunjapur, A.M.; Hyun, J.C.; Prather, K.L.J. “Deregulation of *S*-adenosylmethionine biosynthesis and regeneration improves methylation in *E. coli de novo* vanillin biosynthesis pathway.” *Microb. Cell Fact.* **2016** 15 (1), 1. DOI: 10.1186/s12934-016-0459-x.
06. Kunjapur, A.M.; Cervantes, B.; Prather, K.L.J. “Coupling carboxylic acid reductase to inorganic pyrophosphatase enhances cell-free *in vitro* aldehyde biosynthesis.” *Biochem. Eng. J.* **2016** 109 (5), 19-27. DOI: 10.1016/j.bej.2015.12.018.
05. Sheppard, M.J.†; Kunjapur, A.M.†; Prather, K.L.J. “Modular and selective biosynthesis of gasoline-range alkanes.” *Metab. Eng.* **2016** 33, 28-40. DOI: 10.1016/j.ymben.2015.10.010.
04. Kunjapur, A.M.; Prather, K.L.J. “Microbial engineering for aldehyde synthesis.” *Appl. Environ. Microbiol.* **2015** 81 (6), 1892-1901. DOI: 10.1128/AEM.03319-14.
03. Sheppard, M.J.; Kunjapur, A.M.; Wenck, S.J.; Prather, K.L.J. “Retrobiosynthetic modular approach to pathway design achieves selective pathway for microbial synthesis of the gasoline substitute 4-methyl-pentanol.” *Nat. Commun.* **2014** 5, 5031. DOI: 10.1038/ncomms6031.
02. Kunjapur, A.M.; Tarasova, Y.; Prather, K.L.J. “Synthesis and accumulation of aromatic aldehydes in an engineered strain of *E. coli*.” *J. Am. Chem. Soc.* **2014** 136 (33), 11644-11654. DOI: 10.1021/ja506664a. (Highlighted by *C&EN*)
01. Kunjapur, A.M.*; Eldridge, R.B. “Photobioreactor design for commercial biofuel production from microalgae.” *Ind. Eng. Chem. Res.* **2010** 49 (8), 3516-3526. DOI: 10.1021/ie901459u.

Patent Applications

Before Delaware:

03. Kunjapur, A.M.; Stork, D.A.; Kuru, E.; Church, G.M. “Synthetase variants for incorporation of biphenylalanine into a peptide.” U.S. Provisional Application No. 62/527,115. Filing date: June 30, 2017.
02. Kunjapur, A.M.; Church, G.M. “Method of making proteins with non-standard amino acids.” U.S. Provisional Application No. 62/526,671. Filing date (updated): June 29, 2017.
01. Sheppard, M.J.; Kunjapur, A.M.; Prather, K.L.J. “Microbial production of branched medium chain alcohols, such as 4-methylpentanol.” US Patent No. 101000335. Issued: October 16, 2018.

Conference Presentations

Before Delaware:

14. Kunjapur, A.M. “Continuous evolution of engineering synthetic auxotrophs for industrial application.” AIChE Annual Meeting. October 31, 2018.
13. Kunjapur, A.M. “Engineering post-translational proofreading to discriminate non-standard amino acids.” Synthetic Biology Engineering, Evolution & Design. June 4, 2018.
12. Kunjapur, A.M.; Stork, D.A.; Kuru, E.; Vargas-Rodriguez, O.; Landon, M.M.; Söll, D.; Church, G.M. “Engineering post-translational proofreading to discriminate non-standard amino acids.” Protein Engineering Global Summit. May 2, 2018. (Poster)
11. Kunjapur, A.M.[†]; Wannier, T.M.[†]; Rice, D.P.; McDonald, M.J.; Desai, M.M.; Church, G.M. “Adaptive evolution of genomically recoded *Escherichia coli*.” AIChE Annual Meeting. November 2, 2017. (Poster)
10. Kunjapur, A.M.; Stork, D.A.; Kuru, E.; Vargas-Rodriguez, O.; Landon, M.M.; Söll, D.; Church, G.M. “Engineering post-translational proofreading to discriminate non-standard amino acids.” AIChE Annual Meeting. October 30, 2017.
09. Kunjapur, A.M.; Kuru, E.; Stork, D.A.; Narasimhan, K.; Huang, P.; Mandell, D.J.; Aach, J.; Church, G.M. “Non-standard amino acid incorporation in the new era of recoded genomes.” DOE Genomic Sciences PI Meeting. February 06, 2017. (Poster)
08. Kunjapur, A.M.[†]; Wannier, T.M.[†]; Rice, D.P.; McDonald, M.J.; Desai, M.M.; Church, G.M. “Long-term adaptive evolution of genomically recoded *Escherichia coli*.” Synthetic Biology Engineering Evolution and Design (SEED). July 20, 2016. (Poster)
07. Kunjapur, A.M.[†]; Sheppard, M.J.[†]; Prather, K.L.J. “Biosynthesis of key gasoline-range alkanes using engineered *E. coli*.” 249th American Chemical Society Meeting. March 25, 2015.
06. Kunjapur, A.M.; Tarasova, Y.; Prather, K.L.J. “Synthesis and accumulation of aromatic aldehydes using engineered *Escherichia coli*.” Keystone Symposia on Genome Engineering. January 11, 2015. Travel supported by NSF/Keystone. (Poster)
05. Kunjapur, A.M.; Tarasova, Y.; Prather, K.L.J. “Synthesis and accumulation of aromatic aldehydes using engineered *Escherichia coli*.” AIChE Annual Meeting. November 19, 2014. Travel supported by MIT Graduate Student Council.
04. Kunjapur, A.M.; Tarasova, Y.; Prather, K.L.J. “Synthesis and accumulation of aromatic aldehydes using engineered *Escherichia coli*.” Synberc Fall Retreat. September 27, 2014.
03. Olsen, B.; Khlystov, N.; Prather, K.; Kunjapur, A. “Materials properties of cyanophycin, a non-ribosomally synthesized polypeptide.” 248th American Chemical Society Meeting. August 10, 2014. (Poster)

02. Kunjapur, A.M.; Tarasova, Y.; Prather, K.L.J. “Engineering *E. coli* for synthesis of aromatic aldehydes as products or intermediates under aerobic growth.” 247th American Chemical Society Meeting. March 19, 2014. Travel supported by Dow Chemical.
01. Dueber, J.; Connell, K.; Wu, G.; Kunjapur, A.; Prather, K. “Synthetic co-assembly of metabolic enzymes for improved flux.” Protein Science. August 01, 2012. (Poster)

Invited Talks

13. “Expanding the microbial chemistry repertoire.” Microbial Systems Symposium, University of Delaware. February 6, 2019.
12. “Policy approaches to synthetic biology and do-it-yourself (DIY) biology.” (Panelist) American Society for Microbiology (ASM) Biothreats Conference. January 29, 2019.

Before Delaware:

11. “Expanding the microbial chemistry repertoire by engineering selective processes.” Institute for Bioscience and Biotechnology Research, National Institute of Standards and Technology (NIST) / University of Maryland. April 12, 2018.
10. “Gene synthesis allows biologists to source genes from farther away in the tree of life.” Addgene (non-profit plasmid repository). March 06, 2018.
09. “Expanding the microbial chemistry repertoire by engineering selective processes.” Biomedical Engineering, Boston University. March 01, 2018.
08. “Expanding the microbial chemistry repertoire by engineering selective processes.” Chemical Engineering, University of Maryland – College Park. February 15, 2018.
07. “Expanding the microbial chemistry repertoire by engineering selective processes.” Chemical Engineering, Columbia University. January 26, 2018.
06. “Expanding the microbial chemistry repertoire by engineering selective processes.” Chemical Engineering, Texas A&M University. January 22, 2018.
05. “Expanding the microbial chemistry repertoire by engineering selective processes.” Chemical and Biomolecular Engineering, University of Delaware. January 05, 2018.
04. “Engineering post-translational proofreading to discriminate non-standard amino acids.” First Annual N-term Workshop, Leibniz Institute of Plant Biochemistry. September 13, 2017.
03. “Engineering post-translational proofreading to discriminate non-standard amino acids.” Chemical Engineering, Rose-Hulman Institute of Technology. April 21, 2017.
02. “Engineering post-translational proofreading to discriminate non-standard amino acids.” Dieter Söll Lab, Molecular Biophysics and Biochemistry, Yale University. March 31, 2017.
01. “Engineering post-translational proofreading to discriminate non-standard amino acids.” Jeff Gray Lab, Chemical and Biomolecular Engineering, Johns Hopkins University. February 14, 2017.

Professional Service

National study participant:

Biological security study, Johns Hopkins Center for Health Security (January 9, 2018)

Manuscript reviewer:

3Biotech

ACS Synthetic Biology

Journal of the American Chemical Society

Metabolic Engineering Communications

Microbial Cell Factories

Conference abstract reviewer:

Synthetic Biology Engineering Evolution and Design (SEED) 2017

Organizational service:

International Genetically Engineered Machines (iGEM) Team, University of Delaware, 2019 Co-Advisor

Before Delaware:

MIT Energy Club, 2013-2014 Co-President

SynBERC Students and Postdoc Association, 2014 Co-President

Thesis committee member:

Michael Dahle, Chemical & Biomolecular Engineering, 2019-present

Andrew Urmev, Chemistry & Biochemistry, 2018-2019

Qualifiers committee member:

Michael Dahle, Chemical & Biomolecular Engineering, 2019

Mentorship

Doctoral trainees:

1. Neil Butler, Chemical & Biomolecular Engineering, 2019-present
2. Sabyasachi Sen, Chemical & Biomolecular Engineering, 2019-present
3. Morgan Sulzbach, Chemical & Biomolecular Engineering, 2019-present

Undergraduate trainees:

1. Ryan Buchser, Chemical & Biomolecular Engineering, 2019-present
2. Natalie Fuhr, Chemical & Biomolecular Engineering, 2019-present
3. Sean Wirt, Chemical & Biomolecular Engineering, 2019-present