

TAE SEOK MOON

Assistant Professor

Washington University in St. Louis

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EECE Dept. & DBBS Program, 1 Brookings Dr. Brauer Hall, 3004, St. Louis MO 63130

Education

Dept. of Chemical Engineering, MIT, Cambridge, MA, USA Feb. 2010
PhD in Chemical Engineering (Minor: Biological Chemistry). GPA 4.7 / 5.0.

Dept. of Chemical Technology, Seoul National University (SNU), Seoul, Korea Feb. 2000
MS in Engineering. GPA 4.24 / 4.30.

Dept. of Chemical Technology, SNU, Seoul, Korea Feb. 1998
BS in Engineering. GPA 4.21 / 4.30 (*summa cum laude*).
Ranked **No. 1 among 977 students** in College of Engineering.

Research Experience (Academia)

Moon Group, Principal Investigator, Washington University in St. Louis (WashU), MO

Division of Biology and Biomedical Sciences (DBBS) Since Jan. 2013

Department of Energy, Environmental and Chemical Engineering (EECE) Since Jul. 2012

Field: Synthetic Biology, Systems Biology, and Metabolic Engineering

Goal: Understanding and Engineering Model and Non-Model Organisms by Building Genetic Circuits from the Bottom-up

Example Application Areas: Disease Prevention/Cure, Biochemical/Fuel Production, Microbial Nitrogen Fixation, Bioremediation, Environmental Signal Sensing Using Microorganisms

Christopher Voigt Group (MIT & UCSF)

Biological Engineering, MIT, Cambridge, MA Aug. 2011 to Jun. 2012

Postdoctoral Associate

Pharmaceutical Chemistry, UCSF, San Francisco, CA Jan. 2010 to Jul. 2011

Postdoctoral Scholar

Synthetic Biology: designing, constructing, and optimizing biological parts, devices, and systems for applications

Construction of synthetic genetic circuits to control endogenous regulatory networks and cellular phenotypes

Refactoring: re-coding the genes of multi-component molecular machines for simplification and re-use

Kristala Prather Group

Chemical Engineering, MIT, Cambridge, MA Nov. 2005 to Nov. 2009

Research Assistant

Metabolic Engineering: constructing and optimizing biosynthetic pathways in bacteria

Constructed and optimized synthetic pathways/network to produce chemicals in metabolically engineered *E. coli*

Engineered enzymes to create novel enzymes with altered substrate specificities

Bioengineering Lab, SNU, Seoul, Korea

Sep. 1997 to Dec. 1999

Research Assistant

Research on immunosuppressant FK-506 and biosynthesis of rifamycin derivatives by gene swapping

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Assistant Professor at Washington University in St. Louis (EECE & DBBS)

Research Experience (Industry)

LG Life Sciences, Ltd.¹, Daejeon, Korea

Aug. 2002 to May. 2005

Manager & Research Scientist

Coordinated the pre-clinical studies of hyaluronan (HA) derivatives.

Developed SR-hGH² (Phase II Clinical Trial) and prepared/submitted Drug Master File to FDA³.

Participated in the process of obtaining a Certificate of Suitability from EDQM⁴.

Provided technical support to launch two HA products for osteoarthritis treatment and ophthalmic surgery.

LG Chem Investment, Ltd.⁵, Daejeon, Korea

Apr. 2001 to Jul. 2002

Assistant Manager & Research Scientist

Performed research on smart polymers, micro-encapsulation of HA-based beads, and their rheological properties.

Developed biopolymer derivatives for dermal implantation, osteoarthritis treatment, and tissue engineering.

Set up the purification process of HA and performed scale-up studies.

Participated in the construction of cGMP⁶ facilities and process validation for HA manufacturing.

LG Chemical, Ltd., Daejeon, Korea

Jan. 2000 to Mar. 2001

Researcher

Performed research to develop HA-based eye drops and cosmetics.

Optimized the fermentation condition and performed scale-up studies to construct manufacturing facilities of HA.

Teaching Experience (Summary)

EECE Dept. & DBBS Program^{*}, Washington Univ. St. Louis, MO

Since Jul. 2012

Instructor and Research Advisor

Teaching One Course per Semester and Supervising Undergrad (23^{**}) and Grad (7) Research

iGEM (international Genetically Engineered Machine)^{*} Team**

2009; since 2013

Project Advisor

Grad Student Teaching Certificate Program, MIT, Cambridge, MA

Fall semester, 2009

Trainee

Dept. of Chemical Engineering, MIT, Cambridge, MA

Sep. 2007 to Aug. 2009

Supervisor of Six Undergrad Research Projects (4 Female & 2 Male)

Undergrad Research Opportunities (*Five students chose grad schools in STEM.*)

Project Designer, Project Consultant & Teaching Assistant

Biological Engineering Lab (Spring, 2009) & Chemical-Biological Engineering Lab (Fall, 2008)

Dept. of Chemical Technology, SNU, Seoul, Korea

Mar. 1998 to Dec. 1999

Teaching Assistant

Four semesters with six courses in Chemical Engineering and Bioengineering

1) LG Life Sciences, Ltd. was spun off from LG Chem Investment, Ltd.

2) Sustained Release Human Growth Hormone

3) Food and Drug Administration

4) European Directorate for the Quality of Medicines

5) LG Chem Investment, Ltd. was demerged from its parent company, LG Chemical, Ltd.

6) current Good Manufacturing Practice

* Energy, Environmental and Chemical Engineering & Division of Biology and Biomedical Sciences.** Ten students chose grad school in STEM.

*** Supervised the MIT team in 2009; Advising the Washington University iGEM teams since 2013.

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Assistant Professor at Washington University in St. Louis (EECE & DBBS)

Courses Taught (at WashU)

Metabolic Engineering & Synthetic Biology EECE551

Instructor (Fall Semesters; ongoing)

2012-2016

Developed and offered the first synthetic biology course at WashU

The number of students enrolled: 7 per semester (average); 34 total (25 grad students, 8 undergrad students, and 1 law school student)

ChE Capstone EECE402 (Previously, Process & Product Design ChE478A)

Instructor (Spring Semesters; ongoing)

2014-2017

Developed a new design course for senior undergraduate students by incorporating product design projects as well as process design projects (previously, only process design covered).

The number of students enrolled: 45 senior undergrad students per semester (average); 180 total

Graduate Students & Other Researchers Supervised

Number of current postdoctoral researchers: 1

Soo-Jung Kim (2017 – present)

Number of current PhD students (degree year anticipated to be awarded): 5

William Henson (2017), Tatenda Shopera (2017), Young Je Lee (2018), Drew DeLorenzo (2019), and Austin Rottinghaus (2021)

Number of PhD students graduated (thesis defense year): 2

Cheryl Immethun (2016; now a postdoctoral researcher at University of Nebraska)

PhD Thesis: Genetic Circuits for Transcriptional Regulation in *Synechocystis* sp. PCC 6803

Allison Hoynes-O'Connor (2016; now at L.E.K. Consulting)

PhD Thesis: Development and Characterization of Genetic Sensors and Regulators for the Construction of Environmentally-Responsive Genetic Circuits

Number of rotation students (excluding the students above): 16

Andrea Balassy, Wen Jiang, Manan Pathak, Arshag Mooradian, Christopher Bowen, Hui-Yuan Chen, Yu He, Benjamin Wolf, Wei Bai, Dinesh Gupta, Cameron Sargent, John Creamer, Eugene Kim, Alexander Schmitz, Charles Johnson, and Philippe Azimzadeh

Number of graduate students in other labs (served as a thesis committee member): 15

Arul Varman, Yu Xia, Le You, Gang Wu, Lian He, Wen Jiang, Hui-Yuan Chen, Whitney Hollinshead, Di Liu, Andrea Balassy, Mary Abernathy, Tolutola Oyetunde, Wei Bai, Po-Cheng Lin, and Brian Thompson (ASU)

Number of previous technicians: 3 (two at grad schools and one preparing for grad school)

Kenneth Ng, Soo Ji Kim, and Andrew Ng

Number of undergraduate students: 29

15 (in grad schools or received a PhD/MS degree): A Lanza (UT Austin); T Dinio (UNC); J Roy-Mayhew (Princeton); Y Min (GIT); MJ Mui Ching (Harvard); K Lingard (WU); YC Lee (WU); A Ng (UC Berkeley); SJ Kim (U Chicago); J Ulan (Drexel U); C Focht (Yale); B Actkinson (Rice U); T Blevin (WU); K Hinman (Brown U); M Leong (MD program, St. Louis U)

14 (Still undergrad, or in industry and others): V Kirksey; B Waldron-Feinstein; L Kirchner; YJ Kim; C Sihao; KJ Park; JR Wang; S Srivastava; B Huang; D Wu; S Wang; M Toomey; G Myers; Z Glick

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Other Experience

The Office of Student Citizenship, MIT, Cambridge, MA Jun. 2009
Trained for mediation (Mediation Skills Training Certificate)

Scholarships, Awards & Memberships

ONR Young Investigator Award	Jun. 2017 to May. 2020
Member of Engineering Biology Research Consortium (EBRC)	Since 2016
Best of BIOT Award (American Chemical Society)	2016
NSF CAREER Award	Apr. 2014 to Mar. 2019
Senior Investigator of CenSURF (NSF center)	2014 to 2015
Member of Washington Univ. Division of Biology and Biomedical Sciences	Since 2013
Affiliated Principal Investigator of SynBERC (NSF center)	2012 to 2016
30 th Annual Department Conference Poster Competition (MIT, 2 nd Prize)	Oct. 2009
Member (AIChE since 2007; SIMB, ACS & ASM in the past)	Since 2007
ILJU Foundation Fellow Award	Sep. 2005 to Aug. 2009
John C. Sluder (1941) Fellowship	Sep. 2005 to May. 2006
LG Chemical Fellowship	Mar. 1998 to Dec. 1999
The President Prize (No. 1 among 977 students)	Feb. 1998
SNU Honor Scholarship	Sep. 1994 to Feb. 1998

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Publications (32 total including 1 under review; 21 from WashU as PI)

Peer-Reviewed Research Journal Articles (at WashU)

14. DM DeLorenzo, WR Henson and **TS Moon**⁺. Development of Chemical and Metabolite Sensors for *Rhodococcus opacus* PD630. *Under review*.
13. T Shopera, WR Henson and **TS Moon**⁺. Dynamics of sequestration-based gene regulatory cascades. *Nucleic Acids Res.* Accepted. DOI: 10.1093/nar/gkx465
12. CM Immethun, DM DeLorenzo, **CM Focht**, D Gupta, CB Johnson and **TS Moon**⁺. Physical, Chemical, and Metabolic State Sensors Expand the Synthetic Biology Toolbox for *Synechocystis* sp. PCC 6803. *Biotechnol. Bioeng.* Accepted. DOI: 10.1002/bit.26275
11. A Hoynes-O'Connor, T Shopera, **K Hinman**, JP Creamer and **TS Moon**⁺. Enabling Complex Genetic Circuits to Respond to Extrinsic Environmental Signals. *Biotechnol. Bioeng.* Accepted. DOI: 10.1002/bit.26279
10. T Shopera, L He, T Oyetunde, YJ Tang and **TS Moon**⁺. Decoupling resource-coupled gene expression in living cells. *ACS Synth. Biol.* Accepted. DOI: 10.1021/acssynbio.7b00119
9. N Wan*, DM DeLorenzo*, L He*, L You, CM Immethun, G Wang, EEK Baidoo, W Hollinshead, JD Keasling, **TS Moon**⁺ and YJ Tang⁺. Cyanobacterial carbon metabolism: fluxome plasticity and oxygen dependence. *Biotechnol. Bioeng.* Accepted. DOI: 10.1002/bit.26287
8. A Hoynes-O'Connor and **TS Moon**⁺. Development of design rules for reliable antisense RNA behavior in *E. coli*. *ACS Synth. Biol.* 5, 1441–1454 (2016). **Featured on the Cover Page**
7. R Saha, D Liu, A Hoynes-O'Connor, M Liberton, J Yu, M Bhattacharyya-Pakrasi, A Balassy, F Zhang, **TS Moon**, CD Maranas and HB Pakrasi. Diurnal Regulation of Cellular Processes in the Cyanobacterium *Synechocystis* sp. Strain PCC 6803: Insights from Transcriptomic, Fluxomic and Physiological Analyses. *mBio.* 7, e00464-16 (2016)
6. YJ Lee, A Hoynes-O'Connor, **MC Leong** and **TS Moon**⁺. Programmable control of bacterial gene expression with the combined CRISPR and antisense RNA system. *Nucleic Acids Res.* 44, 2462–2473 (2016)
5. A Yoneda*, WR Henson*, NK Goldner, **KJ Park**, KJ Forsberg, **SJ Kim**, MW Pesesky, M Foston, G Dantas⁺ and **TS Moon**⁺. Comparative transcriptomics elucidates adaptive phenol tolerance and utilization in lipid-accumulating *Rhodococcus opacus* PD630. *Nucleic Acids Res.* 44, 2240–2254 (2016)
4. CM Immethun, KM Ng, DM DeLorenzo, **B Waldron-Feinstein**, **YC Lee** and **TS Moon**⁺. Oxygen-Responsive Genetic Circuits Constructed in *Synechocystis* sp. PCC 6803. *Biotechnol. Bioeng.* 113, 433-442 (2016)
3. WD Hollinshead*, WR Henson*, M Abernathy, **TS Moon**⁺ and YJ Tang⁺. Rapid Metabolic Analysis of *Rhodococcus opacus* PD630 via parallel ¹³C-Metabolite Fingerprinting, *Biotechnol. Bioeng.* 113, 91-100 (2016)

⁺ Corresponding author; * These authors contributed equally to the work.
Undergraduate co-authors (under my supervision) are identified (shaded).

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2. T Shopera, WR Henson, A Ng, YJ Lee, K Ng and **TS Moon**⁺. Robust, tunable genetic memory from protein sequestration combined with positive feedback. *Nucleic Acids Res.* 43, 9086-9094 (2015)
1. A Hoynes-O'Connor, K Hinman, L Kirchner and **TS Moon**⁺. *De novo* design of heat-repressible RNA thermosensors in *E. coli*. *Nucleic Acids Res.* 43, 6166–6179 (2015)

Review Journal Articles, Peer-Reviewed (at WashU)

5. A Hoynes-O'Connor and **TS Moon**⁺. Programmable genetic circuits for pathway engineering. *Curr. Opin. Biotechnol.* 36, 115-121. **Invited Review** (2015)
4. B Thompson, **TS Moon** and D Nielsen. 'Hybrid' Processing Strategies for Expanding and Improving the Synthesis of Renewable Bioproducts. *Curr. Opin. Biotechnol.* 30, 17-23. (2014)
3. D Nielsen*⁺ and **TS Moon***⁺. From Promise to Practice: the Role of Synthetic Biology in Green Chemistry. *EMBO Reports* 14, 1034-1038. **Invited Review** (2013)
2. BM Berla, R Saha, CM Immethun, CD Maranas, **TS Moon** and H Pakrasi. Synthetic Biology of Cyanobacteria: Unique Challenges and Opportunities. *Front. Microbiol.* 4, 246 (2013)
1. CM Immethun, AG Hoynes-O'Connor, A Balassy and **TS Moon**⁺. Microbial Production of Isoprenoids Enabled by Synthetic Biology. *Front. Microbiol.* 4, 75. **Invited Review** (2013)

Book Chapters (at WashU)

1. CM Immethun, WR Henson, X Wang, D Nielsen and **TS Moon**⁺. Engineering Central Metabolism for Production of Higher Alcohol-based Biofuels, Chapter 1, p1-34 in "*Biotechnologies for Biofuel Production and Optimization*" (CA Eckert & CT Trinh, Ed). Elsevier. dx.doi.org/10.1016/B978-0-444-63475-7.00001-7, **Invited Book Chapter** (2016)

Other Contributions (at WashU)

1. **TS Moon**. What Is the Role of Circuit Design in the Advancement of Synthetic Biology? Part 1. Genetic Circuit Applications. *Cell Systems* 4, 370-372. **Invited Opinion "Voices"** (with 8 other contributors)

Peer-Reviewed Research Journal Articles (before WashU)

11. K Solomon, **TS Moon**, B Ma, TM Sanders and KJ Prather. Tuning Primary Metabolism for Heterologous Pathway Productivity. *ACS Synth. Biol.* 2, 126-135 (2013)
10. **TS Moon**, C Lou, A Tamsir, BC Stanton and CA Voigt. Genetic Programs Constructed from Layered Logic Gates in Single Cells. *Nature* 491, 249-253 (2012)
9. **TS Moon**^{*}, D Nielsen^{*} and KJ Prather. Sensitivity Analysis of a Proposed Model Mechanism for Newly Created Glucose 6-Oxidases. *AIChE J.* 58, 2303-2308 (2012)
8. **TS Moon**, EJ Clarke, ES Groban, A Tamsir, RM Clark, M Eames, T Kortemme and CA Voigt. Construction of a Genetic Multiplexer to Toggle between Chemosensory Pathways in *Escherichia coli*. *J. Mol. Biol.* 406, 215-227 (2011)

⁺ Corresponding author; * These authors contributed equally to the work.
Undergraduate co-authors (under my supervision) are identified (shaded).

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7. SM Lippow*, **TS Moon***, S Basu, S-H Yoon, X Li, B Chapman, K Robison, D Lipovšek and KJ Prather. Engineering Enzyme Specificity Using Computational Design of a Defined-Sequence Library. *Chem. Biol.* 17, 1306-1315 (2010). Selected as a “**Recommended**” paper by faculty of 1000
6. **TS Moon**, JE Dueber, E Shiue and KJ Prather. Use of Modular, Synthetic Scaffolds for Improved Production of Glucaric Acid in Engineered *E. coli*. *Metab. Eng.* 12, 298-305 (2010)
5. JE Dueber, GC Wu, GR Malmirchegini, **TS Moon**, CJ Petzold, AV Ullal, KJ Prather and JD Keasling. Synthetic Protein Scaffolds Provide Modular Control over Metabolic Flux. *Nat. Biotechnol.* 27, 753-759 (2009)
4. **TS Moon**, S-H Yoon, M-J Tsang Mui Ching, A Lanza and KJ Prather. Enzymatic Assay of D-Glucuronate Using Uronate Dehydrogenase. *Anal. Biochem.* 392, 183-185 (2009)
3. S-H Yoon, **TS Moon**, P Iranpour, A Lanza and KJ Prather. Cloning and Characterization of Uronate Dehydrogenases from Two Pseudomonads and *Agrobacterium tumefaciens* str. C58. *J. Bacteriol.* 191, 1565-1573 (2009)
2. **TS Moon**, S-H Yoon, A Lanza, J Roy-Mayhew and KJ Prather. Production of Glucaric Acid from a Synthetic Pathway in Recombinant *Escherichia coli*. *Appl. Environ. Microbiol.* 75, 589-595 (2009)
1. SH Kim, K Hyun, **TS Moon**, T Mitsumata, JS Hong, KH Ahn and SJ Lee, Morphology–Rheology Relationship in Hyaluronate/Poly(vinyl alcohol)/Borax Polymer Blends. *Polymer* 46, 7156-7163 (2005)

⁺ Corresponding author; * These authors contributed equally to the work.
Undergraduate co-authors (under my supervision) are identified (shaded).

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Patents (7 total; 2 Licensed to US companies; 4 Products launched)

7. C Lou, **TS Moon**, V Rhodius, B Stanton, A Tamsir, K Temme and CA Voigt, **Synthetic Biology Tools**, US 20130005590 A1⁷ (2011)
6. K Solomon, **TS Moon** and KJ Prather, **Glucose Valve and Other Metabolite Valves**, US patent US8,835,138 B2⁸ (2010)
5. **TS Moon**, S-H Yoon and KJ Prather, **Cellular Production of Glucaric Acid**, US patent US8,835,147 B2⁹ (2008)
4. **TS Moon**, JH Kim, JY Lee, BH Min and KY Cho, **Hyaluronic Acid Derivative Gel and Method for Preparing the Same**, *PCT Int. Appl.* WO04/011503¹⁰ (2004)
3. KY Cho, JH Kim, JY Lee, **TS Moon** and BH Min, **Microbeads of Natural Polysaccharide and Hyaluronic Acid and Processes for Preparing the Same**, *PCT Int. Appl.* WO04/020473 (2004)
2. KY Cho, JH Kim, JY Lee, **TS Moon** and BH Min, **Hyaluronic Acid Derivatives and Processes for Preparing the Same**, *PCT Int. Appl.* WO04/022603 (2004)
1. **TS Moon**, JY Lee, JH Kim and KB Han, **Crosslinked Amide Derivatives of Hyaluronic Acid and Manufacturing Method Thereof**, *PCT Int. Appl.* WO02/030990¹¹ (2002)

7) The patent was licensed to Life Technologies Corporation.

8) The patent was converted to a PCT application in 2011.

9) The patent, licensed to Kalion, was converted to a PCT application in 2009 and applied for in EP (European Union), etc. in 2010.

10) The patent was applied for in US, EP, JP (Japan), CN (China), KR (Republic of Korea), etc.

11) The patent was applied for in US, EP, JP, CN, KR, etc.

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Invited Seminars & Lectures (31)

31. **Invited Speaker** of Chemical Engineering Seminar, Arizona State University (**full travel support**), Tempe, AZ, Apr. 2-3, 2017
30. **Invited Speaker** of 2017 DOE Genomic Sciences Program Meeting, Arlington, VA, Feb. 5-8, 2017
29. **Invited Speaker** of Biological Systems Engineering Seminar, Virginia Tech (**full travel support**), Blacksburg, VA, Sep. 26-27, 2016
28. **Invited Speaker** of Bioinformatics and Computational Biology Graduate Program Seminar, Saint Louis University (**with honorarium**), St. Louis, MO, Aug. 29, 2016
27. **Invited Speaker** of 2016 Metabolic Engineering and Green Manufacturing in Microorganisms, Beijing University of Chemical Technology (**full travel support**), Beijing, China, Jul. 3-4, 2016
26. **Invited Speaker** of Biological Sciences Department, KAIST (**with honorarium**), Daejeon, Korea, Jul. 1, 2016
25. **Invited Speaker** of Chemical and Biological Engineering Department, Seoul National University (**with honorarium**), Seoul, Korea, Jun. 28, 2016
24. **Invited Session Speaker** of AIChE Annual Meeting, Salt Lake City, UT, Nov. 8-13, 2015
23. **Invited Speaker** of Biomed. Eng. Dept Seminar, WashU, St. Louis, MO, Oct. 1, 2015
22. **Invited Session Speaker** of AIChE Annual Meeting, Atlanta, GA, Nov. 16-21, 2014
21. **Invited Speaker** of Indo-US Workshop on Synthetic & Systems Biology (**full travel support from NSF**), New Delhi, India, Nov. 9-12, 2014
20. **Invited Speaker** of SynBERC Fall Meeting at MIT (**full travel support**), Cambridge, MA, Sep. 27-29, 2014
19. **Invited Speaker** of SIMB Annual Meeting (**full support of registration**), St. Louis, MO, Jul. 20-24, 2014
18. **Invited Speaker** of Medical Scientist Training Program Seminar, WashU, St. Louis, MO, Jun. 16, 2014
17. **Invited Speaker** of ASM Biodefense & Emerging Diseases Research Meeting (**full travel support**), Washington, D.C. Jan. 27-29, 2014
16. **Invited Speaker** of Plant & Microbial Biosciences Seminar, WashU, St. Louis, MO, Oct. 29, 2013
15. **Invited Lecture**, BioE Dept. MIT, Cambridge, MA, May 2, 2012
- 9-14. **Six Invited Seminars (full travel support)** at 6 Universities including UBC (Canada, Feb. 26-28), NUS (Singapore, Feb. 14-17), and WashU (St. Louis, USA, Jan. 15-18), January and February, 2012
- 3-8. **Six Invited Seminars (full travel support or with honorarium)** at 6 Universities in Korea including SNU (Seoul), Postech (Pohang), and KAIST (Daejeon), Nov. 14-22, 2011
2. **Invited Speaker** of Synthetic Biology Seminar, MIT, Cambridge, MA, Oct. 24, 2011
1. **Distinguished Young Scientists Seminar Series**, ChemE Dept. Univ. of Washington (**full travel support**), Seattle, WA, Jul. 10-12, 2011. Received “the highest recommendation” among 90 applications.

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Conference Presentations (74 total; 40 Oral; 32 Poster; 2 Webinar)

74. T Shopera, A Hoynes-O'Connor, YJ Lee, C Immethun and **TS Moon**, **Towards developing complex, environmentally-responsive genetic circuits for real-world applications**, *Oral Presentation, SEED2017*, Vancouver, British Columbia, Canada, June 20-23, 2017
73. WR Henson, D DeLorenzo, A Rottinghaus and **TS Moon**, **Systems and synthetic biology of *Rhodococcus opacus* to enable conversion of lignin-derived aromatic compounds into lipids**, *Poster Presentation, SEED2017*, Vancouver, British Columbia, Canada, June 20-23, 2017, **a rapid fire poster session with 1.5 min presentation**
72. WR Henson, D DeLorenzo and **TS Moon**, **Systems and synthetic biology of *Rhodococcus opacus* to enable conversion of lignin-derived aromatic compounds into lipids**, *Oral Presentation, ICBE*, San Diego, CA, January 8-11, 2017
71. YJ Lee, A Hoynes-O'Connor, **MC Leong** and **TS Moon**, **Development of generalizable RNA regulators and CRISPR interference systems for programmable gene expression control**, *Poster Presentation, ICBE*, San Diego, CA, January 8-11, 2017
70. WR Henson, D DeLorenzo, **SJ Kim** and **TS Moon**, **Towards development of *Rhodococcus opacus* as a microbial cell factory: conversion of lignin-derived aromatic compounds into lipids**, *Oral Presentation, AIChE Annual Meeting*, San Francisco, CA, November 13-18, 2016
69. YJ Lee, A Hoynes-O'Connor, **MC Leong** and **TS Moon**, **Construction of programmable genetic circuits through generalizable RNA regulators and CRISPR interference**, *Oral Presentation, AIChE Annual Meeting*, San Francisco, CA, November 13-18, 2016
68. **TS Moon**, **Conversion of lignin-derived aromatic compounds into lipids by engineered *Rhodococcus opacus* strains**, *ACS Best of BIOT Award Webinars, ACS*, October 12, 2016
67. YJ Lee, A Hoynes-O'Connor, **MC Leong** and **TS Moon**, **Constructing programmable genetic circuits through generalizable RNA tools**, *Oral Presentation, SEED2016*, Chicago, IL, July 18-21, 2016.
66. CM Immethun, KM Ng, DM DeLorenzo, **B Waldron-Feinstein**, **YC Lee** and **TS Moon**, **Oxygen-Responsive Genetic Circuits Constructed in *Synechocystis* sp. PCC 6803**, *Poster Presentation & 5-Min Talk, 12th Workshop on Cyanobacteria*, Tempe, AZ, May 19-22, 2016. **Registration and accommodation support.**
65. A Hoynes-O'Connor and **TS Moon**, **Developing design rules for reliable antisense RNA behavior in *E. coli***, *Poster Presentation, Monsanto Fellows Symposium*, Chesterfield, MO, April 13-14, 2016.
64. WR Henson, A Yoneda, NK Goldner, B Berla, **KJ Park**, **SJ Kim**, **KJ Forsberg**, **MW Pesesky**, **M Foston**, **G Dantas** and **TS Moon**, **Conversion of lignin-derived aromatic compounds into lipids by engineered *Rhodococcus opacus* strains**, *Poster Presentation, Monsanto Fellows Symposium*, Chesterfield, MO, April 13-14, 2016.
63. YJ Lee, A Hoynes-O'Connor, **MC Leong** and **TS Moon**, **Programmable control of bacterial gene expression with the combined CRISPR and antisense RNA system**, *Poster Presentation, Monsanto Fellows Symposium*, Chesterfield, MO, April 13-14, 2016.
62. T Shopera, WR Henson, **A Ng**, YJ Lee, K Ng and **TS Moon**, **Robust, tunable genetic memory from protein sequestration combined with positive feedback**, *Poster Presentation, Monsanto Fellows Symposium*, Chesterfield, MO, April 13-14, 2016.
61. CM Immethun, KM Ng, DM DeLorenzo, **B Waldron-Feinstein**, **YC Lee** and **TS Moon**, **Oxygen-Responsive Genetic Circuits Constructed in *Synechocystis* sp. PCC 6803**, *Poster Presentation, Monsanto Fellows Symposium*, Chesterfield, MO, April 13-14, 2016.
60. A Hoynes-O'Connor, C Immethun, D DeLorenzo, K Ng and **TS Moon**, **Programmable genetic sensors and circuits for pathway engineering**, *Oral Presentation, 251st ACS National Meeting*, San Diego, CA, March 13-17, 2016.
59. WR Henson, **SJ Kim**, YJ Tang, M Foston, G Dantas and **TS Moon**, **Conversion of lignin-derived aromatic compounds into lipids by engineered *Rhodococcus opacus* strains**, *Oral Presentation, 251st ACS National Meeting*, San Diego, CA, March 13-17, 2016. **Identified as the "Best Presentation" of the Session**
58. T Shopera, WR Henson, **A Ng**, YJ Lee, K Ng, C Johnson, A Hoynes-O'Connor and **TS Moon**, **Construction of robust, tunable genetic circuits to prevent infectious diseases**, *Oral Presentation, 251st ACS National Meeting*, San Diego, CA, March 13-17, 2016.
57. A Yoneda, WR Henson, NK Goldner, **KJ Park**, **KJ Forsberg**, **SJ Kim**, **MW Pesesky**, **M Foston**, **G Dantas** and **TS Moon**, **Conversion of lignin-derived aromatic compounds into lipids by engineered *Rhodococcus opacus* strains**, *Poster Presentation, 2016 DOE Genomic Science Annual Meeting, Tyson's Corner, VA*, March 6-9,

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- 2016
56. A Hoynes-O'Connor, **K Hinman**, **L Kirchner** and **TS Moon**, **De Novo Design of Heat-Repressible RNA Thermosensors in *E. coli***, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, 2015
 55. T Shopera, WR Henson, K Ng, YJ Lee, **A Ng** and **TS Moon**, **Construction of Robust, Multi-Input Genetic Circuits Linked with Feedback Loops**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, 2015
 54. R Saha, D Liu, A Hoynes-O'Connor, M Liberton, J Yu, M Bhattacharyya, A Balassy, F Zhang, **TS Moon**, CD Maranas and H Pakrasi, **Synechocystis Sp. PCC 6803: Light Plus Endogenous Regulation Governing Gene Expression Patterns in the Diurnal Cycle**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, 2015
 53. WR Henson, **SJ Kim** and **TS Moon**, **Conversion of Aromatic Compounds to Lipids by Engineered *Rhodococcus* Strains**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, 2015
 52. WD Hollinshead, WR Henson, M Abernathy, **TS Moon** and Yinjie Tang, **Elucidating the Metabolism of *Rhodococcus Opacus* PD630 via Parallel ¹³C-Metabolite Fingerprinting**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, 2015
 51. C Immethun, K Ng, **YC Lee**, **B Waldron-Feinstein** and **TS Moon**, **Oxygen-Responsive Genetic Circuits Constructed in *Synechocystis* Sp. PCC 6803**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, 2015
 50. WD Hollinshead, C Immethun, D Delorenzo, L He, M Abernathy, WR Henson, **TS Moon** and YJ Tang, **¹³C Metabolite Fingerprinting and its application for metabolic engineering of cyanobacterial cell factory**, *Oral Presentation, Annual Midwest/Southeast Photosynthesis Conference*, Marshall, IN, October 23-25, 2015
 49. H Pakrasi, M Bhattacharyya, D Liu, M Liberton, J Yu, T Mueller, C Maranas, A Hoynes-O'Connor, C Immethun, **TS Moon**, A Balassy, Y Xiao and F Zhang, **Engineering nitrogen fixation ability in *Synechocystis* 6803**, *Oral Presentation, 15th ISPP*, Tubingen, Germany, August 2-6, 2015
 48. T Shopera, A Hoynes-O'Connor, C Immethun, K Ng, YJ Lee, WR Henson and **TS Moon**, **Construction of robust, multi-input genetic circuits linked with feedback loops**, *Poster Presentation, GRC Synthetic Biology*, Newry, ME, June 28 - July 3, 2015
 47. T Shopera, A Hoynes-O'Connor, C Immethun, WR Henson, K Ng, YJ Lee and **TS Moon**, **Towards construction of programmable cells to prevent infectious diseases**, *Poster Presentation, SEED2015*, Boston, MA, June 9-13, 2015
 46. K Ng, T Shopera, WR Henson, A Hoynes-O'Connor, C Immethun, YJ Lee and **TS Moon**, **Construction of programmable cells to prevent infectious diseases**, *Poster Presentation, Global Health and Infectious Disease Conference*, St. Louis, MO, April 9-11, 2015
 45. TJ Mueller, A Balassy, M Bhattacharyya, A Hoynes-O'Connor, C Immethun, M Liberton, D Liu, R Saha, Y Xiao, J Yu, **TS Moon**, F Zhang, CD Maranas and H Pakrasi, **Transferring Nitrogen Fixing Capabilities to an Oxygenic Photosynthetic Organism**, *Oral Presentation, 249th ACS National Meeting*, Denver, CO, March 22-26, 2015
 44. C Focht, **B Huang**, **J Lee**, **H Li**, **A Ng**, B Berla, C Immethun, **TS Moon** and H Pakrasi, **NitroGENIUS: Engineering *E. coli* to Fix Nitrogen and Regulating Transcription with Light**, *Oral Presentation, IBE Annual Conference*, St. Louis, MO, March 5-7, 2015
 43. WR Henson, **SJ Kim**, **S Srivastava**, **KJ Park** and **TS Moon**, **Development of a generalized platform to produce value-added chemicals from lignocellulose**, *Featured Oral Presentation, IBE Annual Conference*, St. Louis, MO, March 5-7, 2015
 42. A Hoynes-O'Connor, **L Kirchner** and **TS Moon**, **Development of modular, heat-repressible RNA thermosensors in bacteria**, *Oral Presentation, IBE Annual Conference*, St. Louis, MO, March 5-7, 2015
 41. C Immethun, K Ng, **YC Lee**, **B Waldron-Feinstein** and **TS Moon**, **Engineering cyanobacteria as sustainable biotechnology platforms through synthetic biology tools**, *Oral Presentation, IBE Annual Conference*, St. Louis, MO, March 5-7, 2015
 40. T Shopera, A Hoynes-O'Connor, C Immethun, K Ng, YJ Lee, WR Henson and **TS Moon**, **Construction of robust, multi-input genetic circuits linked with feedback loops**, *Oral Presentation, IBE Annual Conference*, St. Louis, MO, March 5-7, 2015
 39. A Hoynes-O'Connor, **L Kirchner** and **TS Moon**, **Development of heat-repressible RNA thermosensors in**

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- bacteria**, *Oral Presentation, AIChE Annual Meeting*, Atlanta, GA, November 16-21, 2014
38. T Shopera, A Hoynes-O'Connor, C Immethun, K Ng, YJ Lee, WR Henson and **TS Moon**, **Construction of programmable cells to prevent infectious diseases**, *Oral Presentation, AIChE Annual Meeting*, Atlanta, GA, November 16-21, 2014
 37. C Immethun, K Ng, YC Lee, B Waldron-Feinstein and **TS Moon**, **Engineering cyanobacteria as sustainable biotechnology platforms through synthetic biology tools**, *Oral Presentation, AIChE Annual Meeting*, Atlanta, GA, November 16-21, 2014
 36. WR Henson, SJ Kim, S Srivastava, KJ Park and **TS Moon**, **Development of a generalized platform to produce value-added chemicals from lignocellulose**, *Oral Presentation, AIChE Annual Meeting*, Atlanta, GA, November 16-21, 2014
 35. A Hoynes-O'Connor, L Kirchner and **TS Moon**, **Development of heat-repressible RNA thermosensors in bacteria**, *Poster Presentation, SIMB*, St. Louis, MO, July 20-24, 2014
 34. C Immethun, K Ng, YC Lee and **TS Moon**, **Engineering *Synechocystis* sp. PCC 6803 as a sustainable biotechnology platform through synthetic biology tools**, *Poster Presentation, SIMB*, St. Louis, MO, July 20-24, 2014
 33. WR Henson, KJ Park, S Srivastava and **TS Moon**, ***Rhodococcus opacus*: metabolic evolution and genetic tools for production of biofuels and value-added products from lignocellulosic biomass**, *Poster Presentation, SIMB*, St. Louis, MO, July 20-24, 2014
 32. T Shopera, A Hoynes-O'Connor, C Immethun, WR Henson and **TS Moon**, **Towards Infectious Disease Prevention**, *Oral Presentation, SEED2014*, Manhattan Beach, CA, July 14-17, 2014
 31. TJ Mueller, R Saha, **TS Moon**, F Zhang, CD Maranas and H Pakrasi, **Designing nitrogen fixation circuit in an oxygenic photosynthetic organism**, *Poster Presentation, Metabolic Engineering X*, Vancouver, BC, June 15-19, 2014
 30. T Shopera, C Immethun, WR Henson and **TS Moon**, **Toward Practical Applications of Synthetic Biology: Part Mining to Construction of Programmable Cells**, *Oral Presentation, AIChE Annual Meeting*, San Francisco, CA, November 3-8, 2013
 29. **TS Moon** and CA Voigt, **Construction of Genetic Programs by Layering Logic Gates in Single Cells**, *Poster Presentation, ICBE*, Fort Lauderdale, FL, January 13 - 16, 2013, *a rapid fire poster session with 1.5 min presentation*
 28. **TS Moon** and CA Voigt, **Construction of Genetic Programs by Layering Logic Gates in Single Cells**, *Oral Presentation, AIChE Annual Meeting*, Pittsburgh, PA, October 28 - November 2, 2012
 27. **TS Moon** and CA Voigt, **Construction of Genetic Programs by Layering Logic Gates in Single Cells**, *Poster Presentation, DDPS 14th Annual Fall Symposium*, St. Louis, MO, September 26-28, 2012
 26. K Solomon, **TS Moon** and KJ Prather, **Glucose Valves: Tuning Primary Metabolism for Heterologous Production**, *Webinars, ACS*, October 28, 2011
 25. **TS Moon** and CA Voigt, **Construction of Synthetic Circuits by Harnessing Orthogonal Genetic Parts**, *Oral Presentation, AIChE Annual Meeting*, Minneapolis, MN, October 16-21, 2011
 24. **TS Moon**, **Synthetic Control of Metabolic Pathways to Improve Productivity of Biomass-Based Chemicals and Drugs**, *Poster Presentation, AIChE Annual Meeting*, Minneapolis, MN, October 16-21, 2011
 23. **TS Moon** and CA Voigt, **Construction of Synthetic Circuits by Harnessing Orthogonal Genetic Parts**, *Poster Presentation (with a Travel Award), SB5.0*, Stanford, CA, June 15-17, 2011
 22. EA Mirsky, D Sukovich, **TS Moon** and CA Voigt, **Refactoring Type III Secretion**, *Poster Presentation, SB5.0*, Stanford, CA, June 15-17, 2011
 21. K Solomon, **TS Moon** and KJ Prather, **Glucose Valves: Tuning Primary Metabolism for Heterologous Production**, *Oral Presentation, 241st ACS National Meeting*, Anaheim, CA, March 27-31, 2011
 20. K Solomon, **TS Moon** and KJ Prather, **A Glucose Valve for Pathway Engineering**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 7-12, 2010
 19. **TS Moon**, JE Dueber, S-H Yoon, E Shiue and KJ Prather, **Enhancing Production of Glucaric Acid from a Synthetic Pathway in Recombinant *Escherichia coli***, *Oral Presentation, AIChE Annual Meeting*, Nashville, TN, November 8-13, 2009
 18. **TS Moon**, SM. Lippow, S Basu, S-H Yoon, X Li, B Chapman, K Robison, D Lipovšek and KJ Prather, **Computational Design and Selection of Glucose Oxidase**, *Poster Presentation, AIChE Annual Meeting*, Nashville, TN, November 8-13, 2009
 17. **TS Moon** and KJ Prather, **Synthetic Biology: An Evolving Field to Create New Biological Components and Systems**, *Poster Presentation, AIChE Annual Meeting*, Nashville, TN, November 8-13, 2009

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16. **TS Moon**, JE Dueber, S-H Yoon, E Shiue and KJ Prather, **Enhancing Production of Glucaric Acid from a Synthetic Pathway in Recombinant *Escherichia coli***, *Oral Presentation, 238th ACS National Meeting*, Washington D.C., August 16-20, 2009
15. **TS Moon**, SM. Lippow, S Basu, S-H Yoon, X Li, B Chapman, K Robison, D Lipovšek and KJ Prather, **Computational Design and Selection of Glucose Oxidase**, *Poster Presentation, 238th ACS National Meeting*, Washington D.C., August 16-20, 2009
14. C Martin, **TS Moon**, S-H Yoon, J Dueber and KJ Prather, **Microbial Synthesis of Glucaric and Hydroxyvaleric Acids**, *Poster Presentation, Biochemical Engineering XVI*, Burlington, VT, July 5-9, 2009
13. **TS Moon**, S-H Yoon, J Dueber and KJ Prather, **Improved Microbial Synthesis of Glucaric Acid Using Synthetic Biology Devices**, *Oral Presentation, Summit on Systems Biology: The Microbial World and Beyond*, Richmond, VA, June 16-19, 2009
12. **TS Moon**, S-H Yoon and KJ Prather, **Engineering Microbial Production of Glucaric Acid**, *Oral Presentation, AIChE Annual Meeting*, Philadelphia, PA, November 16-21, 2008
11. C Martin, **TS Moon**, S-H Yoon and KJ Prather, **Microbial Synthesis of Glucaric and Hydroxyvaleric Acids**, *Poster Presentation, Metabolic Engineering VII*, Puerto Vallarta, Mexico, September 14-19, 2008
10. **TS Moon**, S-H Yoon and KJ Prather, **Engineering Microbial Production of Glucuronic and Glucaric Acids**, *Oral Presentation, 236th ACS National Meeting*, Philadelphia, PA, August 17-21, 2008
9. **TS Moon**, S-H Yoon and KJ Prather, **Towards Microbial Synthesis of Glucaric Acid**, *Oral Presentation, AIChE Annual Meeting*, Salt Lake City, UT, November 4-9, 2007
8. **TS Moon**, P Iranpour, A Lanza, L Octavio and KJ Prather, **Towards Microbial Synthesis of Glucaric Acid**, *Oral Presentation, 234th ACS National Meeting*, Boston, MA, August 19-23, 2007
7. **TS Moon**, P Iranpour, A Lanza, L Octavio and KJ Prather, **Towards Microbial Synthesis of Glucaric Acid**, *Poster Presentation, Biochemical Engineering XV*, Quebec City, QC, Canada, July, 2007
6. C Martin, **TS Moon**, P Iranpour and KJ Prather, **Novel Pathway Design for Microbial Production of Organic Compounds**, *Poster Presentation, Metabolic Engineering VI*, Noordwijkerhout, The Netherlands, October, 2006
5. KJ Prather, C Martin, P Iranpour and **TS Moon**, **Novel Pathways for the Microbial Production of Organic Compounds**, *Oral Presentation, 232nd ACS National Meeting*, San Francisco, CA, September 10-14, 2006
4. **TS Moon**, KY Cho, JY Lee, JH Kim and BH Min, **Synthesis and Characterization of Novel Hyaluronan Derivatives**, *Poster Presentation, Hyaluronan 2003*, Cleveland, OH, October 11-16, 2003
3. KY Cho, **TS Moon**, JY Lee, BH Min and JH Kim, **Preparation and Characterization of Novel Hyaluronic Acid Microbeads**, *Poster Presentation, Hyaluronan 2003*, Cleveland, OH, Oct. 11-16, 2003
2. JY Lee, BH Min, **TS Moon**, KY Cho and JH Kim, **Study on the Molecular Characteristics of Hyaluronic Acid Derivatives with GPC-MALS System**, *Poster Presentation, Hyaluronan 2003*, Cleveland, OH, Oct. 11-16, 2003
1. BH Min, JY Lee, **TS Moon**, KY Cho and JH Kim, **Molecular Weight Changes of Sodium Hyaluronate Powder and Solution by Heat Treatment**, *Poster Presentation, Hyaluronan 2003*, Cleveland, OH, Oct. 11-16, 2003

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Service

ICBE Session Chair - 7th International Conference on Biomolecular Engineering, San Diego, CA, Jan. 2017

Technical Program Committee - ACM NanoCom Conference, New York City, NY, Sep. 2016

Poster Session Judge - ICBE, Fort Lauderdale, FL, Jan. 2013

Poster Judge - Global Health & Infectious Disease Conference, St. Louis, MO, Apr. 2015

Conference Session Chair - 11th Workshop on Cyanobacteria, St. Louis, MO, Aug. 2013

AIChE Session Chair (2 sessions) - Annual Meeting, San Francisco, CA, Nov. 2013

AIChE Session Chair (1 session) - Annual Meeting, Atlanta, GA, Nov. 2014

AIChE Session Chair (1 session) - Annual Meeting, Salt Lake City, UT, Nov. 2015

AIChE Session Chair (1 session) - Annual Meeting, San Francisco, CA, Nov. 2016

AIChE Session Chair (1 session) - Annual Meeting, Minneapolis, MN, Oct-Nov. 2017

ACS Session Chair (1 session) - National Meeting, San Diego, CA, Mar. 2016

Paper Reviewer (more than 50 papers) - Chem. Eng. Sci. (2 papers); Front. Microbiol. (2); Front. Bioeng. Biotechnol. (1); ACS Synth. Biol. (13); PLoS One (1); Bioproc. Biosyst. Eng. (1); Biochem. Eng. J. (3); EMCBMM (1); KJCE (1); **Nature Biotechnol.** (1); Biotechnol. Bioeng. (8); J. Biol. Eng. (1); PLoS Comput. Biol. (1); J. Mol. Biol. (1); Curr. Opin. Biotechnol. (2); Biotechnol. J. (3); **Nature Commun.** (2); ACS Catalysis (1); Wiley Book Series (1); BMC Biotechnol. (1); Scientific Reports (1); Metab. Eng. Commun. (1); Curr. Opin. Chem. Biol. (1); and others; since 2012

Proposal Panel - National Science Foundation (three times); 2012, 2013, and 2015

Proposal and Project Reviewer - BBSRC, UK (once); 2014. **ONR (once)**; 2016

Reviewer - HHMI Summer Undergraduate Research Fellowship (SURF); 2013 and 2014

Reviewer - I-CARES proposals (three times); 2014, 2015, and 2017

EECE Department Liaison - Communication between students and faculty members

PhD Internship Program Coordinator - Broadening the student experience as an intern in an industry R&D setting

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Completed Projects

Grand Challenges Explorations Round 10, Gates Foundation (Sole PI)

Programmed Killing of Parasite Eggs by Probiotic Organisms

I-CARES, Washington University I-CARES (PI)

Hybrid Conversion of Lignin: Trees to Fat

Current Projects

NITROGEN, National Science Foundation (Co-PI; Himadri Pakrasi, PI)

Designing Nitrogen Fixing Ability in Oxygenic Photosynthetic Cells

CAREER, National Science Foundation (Sole PI)

Engineering Biological Robustness through Synthetic Control

BER, Department of Energy (Co-PI; Gautam Dantas, PI)

Systems Biology of *Rhodococcus opacus* to Enable Production of Fuels and Chemicals from Lignocellulose

Young Investigator Program, Office of Naval Research (Sole PI)

Engineering Probiotics to Manipulate Neurotransmitters

MCB, National Science Foundation (Sole PI)

Establishing a generalizable model for predictable antisense RNA repression