

Daniel Yong Yoo

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EDUCATION

- 2013 – 2020 **Ph.D. Chemistry** | **New York University** | Graduate School of Arts and Sciences | New York, NY
- Advisor: Professor Paramjit S. Arora
 - Doctoral thesis: Peptidomimetic-based strategies for targeting oncogenic Ras
- 2011 – 2013 **M.S. Biomedical Engineering** | **New York University** | Tandon School of Engineering | New York, NY
- Advisor: Professor Paulo Coelho
 - Master's thesis: Efficacy and viability analysis of BMP-2 coated titanium implants within a sheep iliac model
- 2005 – 2009 **B.S. Bioengineering** | **University of California, Berkeley** | College of Engineering | Berkeley, CA

RESEARCH EXPERIENCE

- Jan 2021 – Present **Voigt Lab** | **Massachusetts Institute of Technology** | Department of Biological Engineering | Cambridge, MA
Postdoctoral Associate | PI: Professor Christopher Voigt
Research summary: Leveraging synthetic biology, chemistry, and microbiology to develop human commensal bacteria and non-model microorganisms as a platform for novel uses in human disease, therapeutics, and cellular food
- Engineered human skin bacteria to alter the chemical composition of skin through bioproduction/degradation of metabolites
 - Upcycling of mixed plastic waste into microbial-based food with bacteria modified to overexpress nutritional compounds
 - Using GRAS microorganisms grown using products from low-cost electrochemical reduction of CO₂ as alternative food sources
- Sep 2013 – Dec 2020 **Arora Lab** | **New York University** | Department of Chemistry | New York, NY
Ph.D./Graduate Student Researcher | PI: Professor Paramjit Arora
Research summary: Combining chemistry and biology to create peptide-based inhibitors targeting protein-protein interactions
- Targeted protein-protein interactions associated with cancer and other diseases states using rationally designed peptide- and proteo-mimetics loaded with non-canonical amino acids, reactive covalent warheads, or bivalent functional groups
 - Elucidated a novel delivery pathway via macropinocytic uptake for diverse peptide scaffolds in Ras mutant cancers
 - Mentored multiple undergraduate and graduate students in chemical biology, organic chemistry, and biochemistry
- Sep 2011 – Sep 2013 **Coelho Lab** | **New York University** | Department of Biomaterials and Biomimetics | New York, NY
M.S./Graduate Student Researcher | PI: Professor Paulo Coelho
- Led multiple projects involving bone grafts, synthetic scaffolds, and biocompatible implants within a variety of animal models (i.e. monkey, dog, rabbit, sheep, and human) in order to enhance bone regeneration and integration
 - Supervised and trained other graduate/dental students and visiting scholars in laboratory techniques, equipment, and projects
- Jun 2009 – Jul 2011 **Stainier Lab** | **UC San Francisco** | Department of Biochemistry and Biophysics | San Francisco, CA
Staff Research Associate | PI: Professor Didier Stainier
- Conducted high-throughput small molecule screens in transgenic zebrafish models to promote pancreas β -cell regeneration
 - Developed and characterized the transgenic *Slurpee* zebrafish line as an *in vivo* model for diabetes
 - Mentored an undergraduate student from UC Berkeley in both positional cloning and chemical screens
- Feb 2007 – Jun 2009 **Lee Lab** | **UC Berkeley** | Department of Bioengineering | Berkeley, CA
Undergraduate Researcher | PI: Professor Luke Lee
- Utilized gold nanoparticle carriers for the selective release of antisense oligonucleotide payloads via optical excitation targeting the ERBB2 (HER2/neu) receptor of breast cancer cells

TEACHING EXPERIENCE

- Spring 2014 **CHEM-UA 125: General Chemistry I** | Professor Zhihua An
CHEM-UA 125: General Chemistry I Laboratory | Professor Barry Rugg
- Fall 2014 **CHEM-UA 225: Organic Chemistry I** | Professor Lara Mahal
CHEM-UA 227: Majors Organic Chemistry I Laboratory | Professor John Henssler
- Spring 2015 **CHEM-UA 226: Organic Chemistry II Laboratory** | Professor Petra Tosovksa
- Fall 2015 **CHEM-UA 881: Biochemistry I** | Professors Paramjit Arora, Nate Traaseth, Neville Kallenbach

HONORS AND AWARDS

- Nov 2018 **2019 Medicinal & Bioorganic Chemistry Foundation Scholar** | 2019 MBCF Conference | Steamboat Springs, CO
- Sep 2018 **Poster Prize** | Tri-Institutional PhD Program in Chemical Biology Symposium 2018 | New York, NY
- Apr 2016 **Outstanding Teaching Award** | NYU College of Arts and Sciences | New York, NY
- 2013 – 2015 **MacCracken Fellowship** | NYU Graduate School of Arts and Sciences | New York, NY
- 2012 – 2013 **Ines Mandl Fellowship** | NYU Tandon School of Engineering | New York, NY
- 2011 – 2013 **Graduate Center Merit Scholarship** | NYU Tandon School of Engineering | New York, NY

TECHNICAL SKILLS

LABORATORY TECHNIQUES			PROGRAMMING		OTHER
2D and 3D Cell Culture	Polymerase Chain Reaction	Microfluidic Device Fabrication w/ PDMS	ApE	Adina	Spoken Korean Written Latin
Nanoparticle Synthesis	Western/Northern Blot	SDS-PAGE/Agarose Gel Electrophoresis	AutoCad	Amira	
UV Spectroscopy	Flow Cytometry/FACS	Bacteria/Yeast/Fungi Culture	FlowJo	Comsol	
Protein Expression	Histology/Histomorphometry	Fluorescent/AFM/SEM Microscopy	ImageJ	Matlab	
Animal Surgeries	Micro-Computerized Tomography	EEG/ECG/EMG/Blood Glucose Tests	InstantJChem	Perl	
Mechanical Stress Testing	Confocal Microscopy	Fourier Transform Infrared Spectrometry	R	Python	
Nanoindentation	X-ray Diffraction Analysis	High-performance Liquid Chromatography	SolidWorks	DraftSight	
Organic/Peptide Synthesis	NMR Spectrometry	High-throughput Chemical Assays	PyMol	UCSF Chimera	
Cell Viability Assays	Gas Chromatography	Plasmid/Vector Cloning/Transfection	ChemDraw	MacroModel	

MEMBERSHIPS

- 2023 – Present **American Institute of Chemical Engineers**
 2016 – 2021 **American Chemical Society**
 2011 – 2021 **New York Academy of Sciences**
 2013 – 2014 **Society for Biomaterials**

CONFERENCES

ORAL PRESENTATIONS

- Jun 2023 **2023 Synthetic Biology: Engineering, Evolution & Design** | Society for Biological Engineering | Los Angeles, CA
 ▪ **Yoo, D.**, Voigt, C.A. “Bacterial deodorant: Engineering human skin commensals to degrade volatile mosquito attractants from the skin metabolome.”

POSTER PRESENTATIONS

- Nov 2024 **2024 International Conference on Microbiome Engineering** | Society for Biological Engineering | Boston, MA
 ▪ **Yoo, D.**, Voigt, C.A. “Commensal Engineering to Change the Chemical Composition of Skin.”
- May 2019 **2019 Chemical Biology Year-End Symposium** | New York Academy of Sciences | New York, NY
 ▪ **Yoo, D.**, Barros, S., Brown, G., Rabot, C., Arora, P.S. “Exploiting the Hunger of Cancer Cells for Peptide Therapeutics.”
- Jan 2019 **2019 Medicinal and Bioorganic Chemistry Conference** | Steamboat Springs, CO
 ▪ **Yoo, D.**, Hauser, A., Joy, S., Bar-Sagi, D., Arora, P.S. “Covalent Targeting of Ras by Rationally Designed Peptidomimetics.”
- Sep 2018 **Tri-Institutional PhD Program in Chemical Biology Symposium** | Rockefeller University | New York, NY
 ▪ **Yoo, D.**, Hauser, A., Joy, S., Bar-Sagi, D., Arora, P.S. “Covalent Targeting of Ras by Rationally Designed Peptidomimetics.”
- Aug 2018 **Nature Conference on Chemical Biology** | New York University | New York, NY
 ▪ **Yoo, D.**, Hauser, A., Joy, S., Bar-Sagi, D., Arora, P.S. “Covalent Targeting of Ras by Rationally Designed Peptidomimetics.”
- Jun 2018 **Bioorganic Chemistry Symposium** | Gordon Research Council | Andover, NH
 ▪ **Yoo, D.**, Hauser, A., Joy, S., Bar-Sagi, D., Arora, P.S. “Covalent Targeting of Ras by Rationally Designed Peptidomimetics.”
- May 2018 **2018 Chemical Biology Year-End Symposium** | New York Academy of Sciences | New York, NY
 ▪ **Yoo, D.**, Joy, S., Arora, P.S. “Covalent Targeting of Ras by Rationally Designed Peptidomimetics.”
- May 2016 **2016 Chemical Biology Year-End Symposium** | New York Academy of Sciences | New York, NY
 ▪ **Yoo, D.**, Joy, S., Arora, P.S. “Covalent targeting of protein-protein interactions by rationally designed peptidomimetics.”
- May 2013 **Biomaterials Revolution – 2013 Annual Meeting and Exposition** | Society for Biomaterials | Boston, MA
 ▪ **Yoo, D.**, Anchieta, R.B., Machada, L., Guastaldi, F., Tovar, N., Coelho, P.G. “Osseointegration effect of BMP-2 on dental implants: A 3-6 week in vivo study.”
- Mar 2013 **2013 General Session and Exhibition** | American Association for Dental Research | Seattle, WA
 ▪ **Yoo, D.**, Anchieta, R.B., Machada, L., Guastaldi, F., Tovar, N., Coelho, P.G. “Periodontal regeneration using brain-derived neurotrophic factor: A non-human primates study.”
- Oct 2012 **Grand Challenges in Biomaterials** | Society for Biomaterials | New Orleans, LA
 ▪ **Yoo, D.**, Anchieta, R.B., Machada, L., Guastaldi, F., Tovar, N., Coelho, P.G. “Osseointegration effect of BMP-2 on dental implants: A 3-6 week in vivo study.”

PATENTS

- Pending Voigt, C.A., Hassan, M.I., Lin, G.M., **Yoo, D.Y.** “Engineering human skin microbes to produce mosquito repellent terpenes,” U.S. Pat. App. Ser. No. PCT/US24/23221, filed April 25, 2024.
- Apr 2024 Arora, P.S., Hong, S.H., **Yoo, D.Y.** “Crosslinked Helix Dimer Mimics of Sos and Methods of Using Same,” U.S. Patent 2024/0124539 A1, filed December 23, 2020, and issued April 18, 2024.

PUBLICATIONS

BOOK CHAPTERS

Dec 2020 **Yoo, D.Y.**, Arora, P.S. "Hydrogen bond surrogate stabilized helices as protein-protein interaction inhibitors," *Protein-protein interaction regulators*, London, UK, Royal Society of Chemistry, 2020, pp. 124-146.

RESEARCH ARTICLES

- Pending **Yoo, D.Y.***, Hassan, M.I.*, Nguyen, T., Rotti, P., Merriman, J., Fischbach, M.A., Voigt, C.A. "Commensal engineering to change the chemical composition of skin," *Manuscript in preparation*, 2024.
- Pending **Yoo, D.Y.**, Natterman, U., Wang, A.Z., Stukenbroeker, T.S., de Winter, T.M., Yadav, S., Hassan, M.I., Yang, D.F., Vientos-Robles, Y., Ho, J., Higginson, C.J., Khan, A.A., Lee, K.I., Yu, O., Le Roy, J.J., Voigt, C.A. "Plastic waste conversion to food ingredients using a chemical-biological process," *Manuscript in preparation*, 2024.
- May 2021 **Yoo, D.Y.***, Hong, S.H.*, Conway, L., Richards-Corke, K.C., Parker, C.G., Arora, P.S. "A Sos proteomimetic as a pan-Ras inhibitor," *Proc Natl Acad Sci*, 2021, 118(18), pp. 1-11.
- Jul 2020 **Yoo, D.Y.**, Barros, S.A., Brown, G.C., Rabot, C., Bar-Sagi, D., Arora, P.S. "Macropinocytosis as a key determinant of peptidomimetic uptake in cancer cells," *J Am Chem Soc*, 2020, 142(34), pp. 11461-14471.
- May 2020 **Yoo, D.Y.**, Hauser, A.D., Joy, S.T., Bar-Sagi, D., Arora, P.S. "Covalent targeting of Ras G12C by rationally designed peptidomimetics," *ACS Chem Bio*, 2020, 15(6), pp. 1604-1612.
- Mar 2016 Bowers, M., **Yoo, D.**, Marin, C., Gil, L., Shabaka, N., Goldstein, M., Janal, M., Tovar, N., Hirata, R., Bonfante, E., Coelho, P.G. "Surface characterization and in vivo evaluation of laser sintered and machined implants followed by resorbable-blasting media process: A study in sheep," *Med Oral Patol Oral Cir Bucal*, 2016, 21(2), pp. 206-213.
- Jul 2015 Sarendranath, A., Khan, R., Marin, C., **Yoo, D.**, Redisch, J., Jimbo, R., Coelho, P.G. "Effect of low speed drilling on osseointegration using simplified drilling procedures," *Brit J Or Max Sur*, 2015, 53(6), pp. 550-556.
- Jun 2015 **Yoo, D.**, Marin, C., Freitas, G., Tovar, N., Bonfante, E., Teixeira, H., Janal, M., Coelho, P.G. "Surface characterization and in vivo evaluation of dual acid-etched and grit-blasted/acid-etched implants in sheep," *Imp Dent*, 2015, 24(3), pp. 256-262.
- Mar 2015 Galli, S., Jimbo, R., Tovar, N., **Yoo, D.**, Achieta, R.B., Yamaguchi, S., Coelho, P.G. "The effect of osteotomy dimension on osseointegration to resorbable media-treated implants: A study in sheep," *J Biomat App*, 2015, 29(8), pp. 1068-1074.
- Oct 2014 Tovar, N., Jimbo, R., Witek, L., Anchieta, R., **Yoo, D.**, Manne, L., Machado, L., Gangolli, R., Coelho, P.G. "The physicochemical characterization and in vivo response of micro/nanoporous bioactive ceramic particulate bone graft materials," *Mat Sci Eng C*, 2014, 43, pp. 472-480.
- May 2014 Coelho, P.G., Takayama, T., **Yoo, D.**, Jimbo, R., Karunakaran, S., Tovar, N., Janal, M.N., Yamano, S. "Nanometer-scale features on micrometer-scale surface texturing: A bone histological, gene expression, and nanomechanical study," *Bone*, 2014, 65, pp. 25-32.
- Feb 2014 Shapiro, M., Tovar, N., **Yoo, D.**, Sobieraj, R.C., Gupta, N., Branski, R., Coelho, P. "Strain rate effects on the mechanical properties and fracture mode of skeletal muscle," *Mat Sci Eng C*, 2014, 39(1), pp. 100-104.
- Jan 2014 Jimbo, R., Tovar, N., Janal, M.N., Mousa, R., Marin, C., **Yoo, D.**, Teixeira, H., Anchieta, R.B., Bonfante, E.A., Konishi, A., Takeda, K., Kurihara, H., Coelho, P.G. "The effect of brain-derived neurotrophic factor on periodontal furcation effects," *PLOS One*, 2014, 9 (1), pp. 1-9.
- Aug 2013 Tovar, N., Jimbo, R., Gangolli, R., Perez, L., Manne, L., **Yoo, D.**, Lorenzoni, F., Witek, L., Coelho, P.G. "Evaluation of bone response to various anorganic bovine bone xenografts: an experimental calvaria defect study," *Int J Or Max Surg*, 2013, pp. 1-10.
- Jun 2013 **Yoo, D.**, Tovar, N., Jimbo, R., Marin, C., Anchieta, R.B., Machado, L.S., Guastaldi, F.P.S., Janal, M.N., Coelho, P.G. "Increased osseointegration effect of BMP-2 on dental implants: An in vivo study," *J Biomed Mat Res A*, 2013, 102(6), pp. 1921-1927.
- Jun 2013 Jimbo, R., Tovar, N., **Yoo, D.Y.**, Janal, M.N., Anchieta, R.B., Coelho, P.G. "The effect of different surgical drilling procedures on full laser-etched microgrooves surface-treated implants: an experimental study in sheep," *Clin Or Imp Res*, 2013, pp. 1-6.
- Nov 2012 Guastaldi, F.S., **Yoo, D.**, Marin, C., Jimbo, R., Tovar, N., Zanetta-Barbosa, D., Coelho, P.G. "Plasma treatment maintains surface energy of the implant surface and enhances osseointegration," *Int J Biomat*, 2012, pp. 1-6.
- May 2012 Andersson, O., Adams, B.A., **Yoo, D.**, Ellis, G.C., Gut, P., Anderson, R.M., German, M.S., Stainier, D.Y.R. "Adenosine signaling promotes regeneration of pancreatic beta cells in vivo," *Cell Metabolism*, 2012, 15 (6), pp. 885-894.
- Sep 2009 Lee, S.E., Sasaki, D.Y., Perroud, T.D., **Yoo, D.**, Patel, K.D. and Lee, L.P. "Biologically functional cationic phospholipid-gold nanoplasmonic carriers," *J Am Chem Soc*, 2009, 131 (39), pp. 14066-14074.

MENTORSHIP

- Nov 2023 – Present **Danny F. Yang**
Current role: Undergraduate student researcher in the Voigt Lab
Institution: Massachusetts Institute of Technology, Department of Biological Engineering
Contact: danfyang@mit.edu
- Sep 2018 – May 2020 **Khyle C. Richards-Corke**
Current role: PhD student in the Balskus Lab
Institution: Harvard University, Department of Chemistry and Chemical Biology
Contact: khylerichardscorke@g.harvard.edu
- Aug 2016 – Aug 2017 **Chris A. Rabot, Ph.D.**
Current role: Scientist at Invizyne
Institution: University of Southern California (formerly)
Contact: carabot94@gmail.com
- Oct 2015 – May 2017 **Catherine G. Pratt, M.D., M.S.**
Current role: Surgical resident in General Surgery
Institution: University of Cincinnati, College of Medicine
Contact: prattcg@ucmail.uc.edu

REFERENCES

- 1) **Christopher A. Voigt, Ph.D.**
Postdoctoral Supervisor
Current role: Daniel I.C. Wang Professor of Biological Engineering (Department head)
Institution: Massachusetts Institute of Technology, Department of Biological Engineering
Contact: cavoigt@gmail.com
- 2) **Paramjit S. Arora, Ph.D.**
Ph.D. Advisor
Current role: Professor of Chemistry
Institution: New York University, Department of Chemistry
Contact: arora@nyu.edu
- 3) **Paulo G. Coelho, M.D., D.D.S., Ph.D.**
M.S. Advisor
Current role: Surgical intern in Plastic Surgery
Institution: University of Miami, Miller School of Medicine
Former role: Professor and Director of Biomaterials and Biomimetics (New York University)
Contact: pgc51@med.miami.edu