

Curriculum Vitae
Alexis C. Komor

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EDUCATION

June 2014 California Institute of Technology
Ph.D. in Chemistry; Cumulative GPA 4.00

December 2008 University of California, Berkeley
B.S. in Chemistry and Mathematics Minor; Cumulative GPA 3.98

RESEARCH INTERESTS

Research in the Komor lab is encompassed by the fields of genome editing, DNA repair, and functional genomics. By illuminating the molecular details involved in DNA damage and repair we aim to uncover genome editing mechanisms, as well as expand our knowledge of how specific DNA mutations drive various disease phenotypes. Through a deeper understanding of how DNA damage is processed within the cell, we endeavor to develop new methods for controlling genome editing outcomes, and identify new types of DNA damage that can be leveraged for genome editing applications. As we develop more specific and efficient genome editing technologies, we will use them to functionally interrogate disease-associated point mutations.

AWARDS

2020 Fortune Magazine 40 Under 40 in Healthcare Awardee
2020 Rosalind Franklin Medal Award Winner
2019 Scialog Fellow
2017 International Society for Transgenic Technologies Young Investigator
2015-2017 National Institute of Health Ruth L. Kirchstein National Research Service Award Postdoctoral Fellowship
2014 Herbert Newby McCoy Award in Chemistry
2010-2013 National Science Foundation Graduate Research Fellowship
2009-2010 Caltech Institute Fellowship
2009 Graduated with Highest Academic Honors from UC Berkeley
2009 Erich O. and Elly Saegebarth Prize in Chemistry from UC Berkeley
2006-2009 Bruce Howard Memorial Scholarship

TRAINING

2014-2017 Postdoctoral Scholar with Prof. David R. Liu
Project: Engineering of Cas9 fusion enzymes for sequence-specific DNA editing technology

2009-2014 Graduate Researcher with Prof. Jacqueline K. Barton
Project: Development of Metalloinsertors with improved cell-selective anticancer activity

2006-2009 Undergraduate Researcher with Prof. Christopher J. Chang
Project: Design and synthesis of first-row transition metal catalysts for dioxygen activation and group transfer

POSITIONS

2017-present Assistant Professor of Chemistry and Biochemistry, UCSD

TEACHING EXPERIENCE

- 2018-present Chemistry 6B: Second quarter of a three-quarter sequence intended for science and engineering majors. Topics include: covalent bonding, gases, liquids, and solids, colligative properties, physical and chemical equilibria, acids and bases, solubility.
- 2018-present Chemistry 116/216: Special Topics in Chemical Biology.
- 2019-present Chemistry 115/215: Genome, Epigenome, and Transcriptome Editing.

MENTORING

Graduate Students			
Name	Degree	Dates	Current Position
Mallory Evanoff (A53245378)	PhD in progress	02/2018-present	N/A
Brodie Ranzau (A53246848)	PhD in progress	02/2018-present	N/A
Elizabeth Porto (A53237454)	PhD in progress	02/2018-present	N/A
Sifeng Gu (A53213885)	PhD in progress	02/2018-present	N/A
Carlos Vasquez (A10141507)	PhD in progress	02/2019-present	N/A
Ashley Wong (A12417230)	PhD in progress	02/2019-present	N/A
Quinn Cowan (A53229284)	PhD in progress	02/2019-present	N/A
Cameron Burnett (A53240953)	PhD in progress	12/2017-present	N/A
Postdoctoral Fellows			
Name		Dates	Current Position
P. Keolu Fox		10/2018-08/2019	Assistant Professor, UCSD
Zsolt Bodai		06/2018-present	N/A

EXTERNAL SERVICE AND ACTIVITIES

- 2018-present Mentor for the Sloan Scholar Fellowship Program
- 2018-present Mentor/ Workshop Host for BEWiSE (Better Education for Women in Science and Engineering)
- 2018 Co-Organizer of the 2nd International Conference on CRISPR Technologies
- 2018 Panelist, Physical Sciences and Mathematics session, California Forum for Diversity in Graduate Education
- 2018 Panelist, "Gene Editing" panel discussion, 2nd Annual SABPA Frontiers in Therapeutics and Diagnostics (FTD) Forum
- 2017-present Manuscript reviewer for Nature, Nature Biotechnology, Nature Medicine, Science Advances, Journal of the American Chemical Society, Proceedings of the National Academy of Sciences, and Cell Research
- 2017-2019 Consultant for Beam Therapeutics
- 2017-present Consultant for Pairwise Plants

INVITED TALKS

- "Investigating the Enzymatic Mechanisms of Base Editing," *The International CRISPR and Gene Editing Symposium* **September 23, 2020**, remote presentation; Keynote speaker
- "Investigating the Chemical and Cellular Mechanisms of Base Editing," *World Congress on In Vitro Biology* **June 10, 2020**, remote presentation.
- "Base Editing: Performing Chemistry on the Genome," *Genome Editing: Sequencing and Innovation* Cell Press Webinars, **December 4, 2019**.
- "Investigating the Chemical and Cellular Mechanisms of Base Editing," *Frontiers in Genome Engineering* **November 25, 2019**, Kobe, Japan.

“Repurposing Viral Defense Enzymes for Genome Editing,” *The American Society for Virology 38th Annual Meeting Satellite Symposia* **July 20, 2019**, Minneapolis, MN.

“Engineering and Evolving Base Editors for the Chemical Modification of DNA Nucleobases,” *Synthetic Biology Gordon Research Conference* **July 15, 2019**, Waterville Valley, NH.

“Base Editing: Performing Chemistry on the Genome,” *DIA Global Annual Meeting* **June 25, 2019**, San Diego, CA.

“Functionally Characterizing Variant of Uncertain Significance Using Base Editors,” *7th Annual Coffey-Holden Prostate Cancer Academy Meeting* **June 22, 2019**, Los Angeles, CA.

“Expanding the Genome Editing Toolbox with Base Editors,” *Janelia Conference, Chemical Tools for Complex Biological Systems II* **May 1, 2019**, Ashburn, VA.

“Base Editing: Using Uracil and Inosine as Genome Editing Intermediates,” *UC Irvine Department of Biological Chemistry Lecture Series* **April 24, 2019**, Irvine, CA.

“Base Editing: Performing Chemistry on the Genome,” *Pathology Research Lecture Series, UCSD Department of Pathology* **April 8, 2019**, San Diego, CA.

“Expanding the Genome Editing Toolbox with Base Editors,” *Wellcome Genome Campus Advanced Courses: Genetic Engineering of Mammalian Stem Cells* **March 21, 2019**, Wellcome Genome Campus, Cambridge, UK.

“Using Uracil as a Genome Editing Intermediate,” *Keystone Symposia, Genome Engineering: From Mechanisms to Therapies* **February 20, 2019**, Victoria, British Columbia Canada.

“Beyond Double Stranded DNA Breaks: Using Uracil and Inosine as Genome Editing Intermediates,” *2nd International Conference on CRISPR Technologies* **December 10, 2018**, San Diego, CA.

“Base Editing: Performing Chemistry on the Genome,” *Genome and Transcriptome Engineering Conference* **October 15, 2018**, La Jolla, CA.

“Base Editing: Performing Chemistry on the Genome,” *California State University, Los Angeles Minority Opportunities in Research (MORE) Seminar Series* **September 28, 2018**, Los Angeles, CA.

“Base Editing: Performing Chemistry on the Genome,” *3rd Annual BNMC Translational Genomics and Epigenomics Symposium* **September 18, 2018**, Buffalo, NY; Keynote Talk.

“Programmable editing of a target base in genomic DNA without double-stranded DNA cleavage,” *Yale School of Medicine Rare Disease Seminar* **June 1, 2018**, New Haven, CT (remote presentation).

“Base Editing: Performing Chemistry on the Genome,” *21st Annual ASGCT Meeting* **May 15, 2018**, Chicago, IL.

“Base Editing Workshop,” *Max Planck Institute for Infection Biology* **April 2018**, Berlin, Germany.

“Base Editing: Performing Chemistry on the Genome,” *Innovative Genomics Institute* **April 2018**, Berkeley, CA.

“A New Approach to Genome Editing,” *Mass Spectrometry: Applications to the Clinical Lab 10th Annual Conference & Exhibit* **January 25, 2018**, Palm Springs, CA; Plenary Talk.

“A New Approach to Genome Editing,” *International Society of Transgenic Technologies Conference* **October 4, 2017**, Snowbird, CO; Young Investigator Awardee.

“A New Approach to Genome Editing,” *Genome Engineering 4.0* **May 2016**, Cambridge, MA.

FUNDED PROJECTS

2048207 02/01/2021-01/31/2026
NSF Faculty Early Career Development Program Award
“CAREER: Investigating the DNA Repair Mechanisms of Non-Traditional Genome Editing Agents”
Role: PI

R35GM138317 09/01/2020-08/31/2025
Maximizing Investigators’ Research Award
“Development and Application of New Genome Editing Tools for the Functional Investigation of Genetic Variants of Uncertain Significance”
Role: PI

GBMF9162.12 03/14/2020-05/14/2021
Gordon and Betty Moore Foundation Seed Funding
“Understanding the Dark Side of the Genome”
Role: PI

R21 GM135736-01 09/20/2019-08/31/2021
Exploratory Research for Technology Development
“Development of New Genome Editing Agents Using RNA Modifying Enzymes”
Role: PI

Beam Therapeutics SRA 05/30/2019-05/29/2020
“Development of a system for the comprehensive identification of DNA repair proteins involved in genome editing outcomes”
Role: PI

15-172-45-IRG 12/22/2017-12/21/2018
American Cancer Society Institutional Research Grant
“A biochemical characterization of the contributions of nucleotide excision repair to cancer and aging”
Role: PI

F32 GM112366 4/1/2015-6/30/2017
Ruth L. Kirschstein National Research Service Award
“Development and validation of a precision genome editing platform”
Role: PI

PUBLICATIONS

Vasquez, C. A.; Cowan, Q. T.; **Komor, A. C.*** “Base Editing in Human Cells to Produce Single Nucleotide Variant Clonal Cell Lines,” *Curr. Protoc. Mol. Biol.* **2020**, 133, e129.

Porto, E. M.; **Komor, A. C.***; Slaymaker, I. M.; Yeo, G. W. “Base Editing: Advances and Therapeutic Opportunities,” *Nat. Rev. Drug Disc.* **2020**, 19, 839.

Rallapalli, K. L.; **Komor, A. C.***; Paesani, F.* “Computer Simulations Explain Mutation-induced Effects on DNA Editing by Adenine Base Editors,” *Sci. Adv.* **2020**, 6, eaaz2309.

Dorrestein, P. C. et al. “Global Effects of the Microbiome Include New Bile-acid Conjugations,” *Nature*, **2020**, 579, 123-129.

Fox, K.; Rallapalli, K. L.; **Komor, A. C.*** “Rewriting Human History and Empowering Indigenous Communities with Genome Editing Tools,” *Genes*, **2020**, 11, 88.

Evanoff, M.; **Komor, A. C.*** "Base Editors: Modular Tools for the Introduction of Point Mutations in Living Cells," *Emerging Topics in Life Sciences*, **2019**, ETLS20190088.

Davies, K.; **Komor, A. C.**; Gaudelli, N.M. "The Beginning of Base Editing: An Interview with Alexis C. Komor and Nicole M. Gaudelli," *The CRISPR Journal*, **2019**, 2, 81-90.

Ranzau, B. L.; **Komor, A. C.*** "Genome, Epigenome, and Transcriptome Editing via Chemical Modification of Nucleobases in Living Cells," *Biochemistry*, **2019**, 58, 330-335.

Gaudelli, N. M.; **Komor, A. C.**; Rees, H. A.; Packer, M. S.; Badran, A. H.; Bryson, D. I.; Liu, D. R. "Programmable Base Editing of A•T to G•C in Genomic DNA without DNA Cleavage," *Nature* **2017**, 551, 464-471.

Komor, A. C.*; Badran, A. H.*; Liu, D. R.* "Editing the Genome Without Double-Stranded DNA Breaks," *ACS Chem. Biol.* **2018**, 13, 383-388.

Komor, A. C.; Zhao, K. T.; Packer, M. S.; Gaudelli, N. M.; Waterbury, A. L.; Koblan, L. W.; Badran, A. H.; Liu, D. R. "Improved Base Excision Repair Inhibition and Bacteriophage Mu Gam Protein Yields C:G-to-T:A Base Editors with Higher Efficiency and Product Purity," *Sci. Adv.* **2017**, 3, eaao4774.

Rees, H. A.; **Komor, A. C.**; Yeh, W. H.; Caetano-Lopes, J.; Warman, M.; Edge, A. S. B.; Liu, D. R. "Improving the DNA specificity and applicability of base editing through protein engineering and protein delivery," *Nat. Commun.* **2017**, 8, 15790.

Kim, Y. B.; **Komor, A. C.**; Levy, J. M.; Packer, M. S.; Zhao, K. T.; Liu, D. R. "Expanding the targeting scope of base editing with engineered Cas9-cytidine deaminase fusions," *Nat. Biotechnol.* **2017**, 35, 371-376.

Komor, A. C.; Badran, A. H.; Liu, D. R. "CRISPR-based technologies for the manipulation of eukaryotic genomes," *Cell* **2017**, 168, 20-36.

Komor, A. C.; Kim, Y. B.; Packer, M. S.; Liu, D. R. "Programmable editing of a target base in genomic DNA without double-stranded DNA cleavage," *Nature* **2016**, 533, 420-424.

Komor, A. C.; Barton, J. K. "An Unusual Ligand Coordination Gives Rise to a New Family of Rhodium Metalloinsertors with Improved Selectivity and Potency," *J. Am. Chem. Soc.* **2014**, 136, 14160-14172.

Weidmann, A. G.; **Komor, A. C.**; Barton, J. K. "Targeted Therapy with Metal Complexes," *Comment. Inorg. Chem.* **2014**, 34, 1-10.

Bailis, J. M.; Gordon, M. L.; Gurgel, J. L.; **Komor, A. C.**; Barton, J. K.; Kirsch, I. R. "An Inducible, Isogenic Cancer Cell Line System for Targeting the State of Mismatch Repair Deficiency," *PLOS ONE*, **2013**, 10, e78726.

Weidmann, A. G.; **Komor, A. C.**; Barton, J. K. "Biological Effects of Simple Changes in Functionality on Rhodium Metalloinsertors," *Philos. Trans. R. Soc. A.*, **2013**, 371, 20120117.

Komor, A. C.; Barton, J. K. "The Path for Metal Complexes to a DNA Target," *Chem. Commun.* **2013**, 49, 3617-3630. (Cover Article)

Komor, A. C.; Schneider, C. J.; Weidmann, A. G.; Barton, J. K. "Cell-Selective Activity of Rhodium Metalloinsertors Correlates with Subcellular Localization," *J. Am. Chem. Soc.* **2012**, *134*, 19223-19233.

Ernst, R. J.; **Komor, A. C.**; Barton, J. K. "Selective Cytotoxicity of Rhodium Metalloinsertors in Mismatch Repair-Deficient Cells," *Biochemistry* **2011**, *50*, 10919-10928.

Soo, H. S.; **Komor, A. C.**; Iavarone, A. T.; Chang, C. J. "A Hydrogen-Bond Facilitated Cycle for Oxygen Reduction by an Acid- and Base-Compatible Iron Platform," *Inorg. Chem.* **2009**, *48*, 10024-10035.

*Indicates corresponding author

PATENTS

"Nucleobase editors comprising nucleic acid programmable DNA binding proteins" Liu, D.R.; Komor, A. C.; Chen, L.; Rees, H. A. US Patent 20180312828 A1

"Nucleobase editors and uses thereof" Liu, D.R.; Komor, A. C.; Rees, H. A.; Kim, Y. US Patent App. 20180312825 A1

"Fusions of cas9 domains and nucleic acid-editing domains" Liu, D. R.; Komor, A. C. US Patent App. 2015016680 A1

"Methods for nucleic acid editing" Liu, D. R.; Komor, A. C. US Patent 9,840,699

"Methods for correcting presenilin point mutations" Liu, D. R.; Komor, A. C. US Patent 9,068,179

"Metalloinsertor complexes targeted to DNA mismatches" Barton, J. K.; Komor, A.C.; Schneider, C. J.; Weidmann, A. G.; Ernst, R. J. US Patent 9,051,345

"Metalloinsertor complexes targeted to DNA mismatches" Barton, J. K.; Komor, A.C.; Schneider, C. J.; Weidmann, A. G.; Ernst, R. J. US Patent 8,859,533