Brandt F. Eichman, Ph.D.

William R. Kenan, Jr. Chair at the College of Arts & Science
Professor and Chair of Biological Sciences
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August 2019

EDUCATION

2000	Doctor of Philosophy, Biochemistry & Biophysics, Oregon State University, Corvallis, OR
1993	Bachelor of Science in Chemistry / Minor in Biology, University of Mississippi, Oxford, MS

PROFESSIONAL EXPERIENCE

2019-2022	**Chair**, Department of Biological Sciences, Vanderbilt University
2016-2019	**Founding Co-Director**, Vanderbilt Program in Biochemistry & Chemical Biology
2016-	**Professor**, Department of Biological Sciences, Department of Biochemistry, Vanderbilt University. Structural and chemical biology of protein-nucleic acid complexes involved in maintenance of genome integrity.
2010-2016	**Associate Professor with Tenure**, Departments of Biological Sciences and Biochemistry, Vanderbilt University
2007-2010	**Assistant Professor**, Department of Biochemistry, Vanderbilt University Medical Center
2004-2010	**Assistant Professor**, Department of Biological Sciences, Vanderbilt University
2000-2004	**Postdoctoral Fellow**, Harvard Medical School, Department of Biological Chemistry and Molecular Pharmacology, Laboratory of Tom Ellenberger. Crystal structures and biochemistry of DNA repair and replication enzymes.
1995-2000	**Graduate Student**, Oregon State University, Department of Biochemistry & Biophysics, Laboratory of P. Shing Ho. Structural biology of nucleic acids, X-ray crystallography. Dissertation Title: “Crystal Structures of DNA Four-way Junctions”
1995	**Research Assistant**, University of Mississippi, Department of Chemistry, Laboratory of Maurice Eftink. Organic synthesis of tryptophan analogs used to probe protein structure.
1993-1994	**Research Assistant**, University of Mississippi, Department of Chemistry, Laboratory of Walter Cleland. Synthetic organic chemistry; X-ray crystallography.

HONORS AND AWARDS

Kelly Gene Cook full academic scholarship, 1989-1993
Kelly Gene Cook graduate scholarship, 1995
First Place, Oral Presentation, Graduate Student Conference, Oregon State University, 1998
American Cancer Society Postdoctoral Fellowship, Declined, 2002
NIH National Research Service Award, Postdoctoral Fellowship, 2002-2004
Vanderbilt Nominee for Damon Runyon Scholar Award, 2004
Vanderbilt Nominee for W.M. Keck Distinguished Young Scholars in Medical Research Award, 2005
American Cancer Society Research Scholar, 2007-2010
Sigma Xi Young Investigator Award, 2009
Vanderbilt-Ingram Cancer Center Impact/Star Award, 2010, 2015, 2017
Vanderbilt Chancellor’s Award for Research, 2011
Keynote speaker at Argonne National Laboratory Annual Users Meeting, Argonne, IL, 2011
Elected Co-Organizer of 2014 FASEB Science Research Conference: *Nucleic Acids Enzymes*, 2012
Appointed to Faculty of 1000, 2013-present
William R. Kenan, Jr. Chair at the College of Arts & Science, Vanderbilt University, 2018

PROFESSIONAL MEMBERSHIPS

American Chemical Society, 1991-present
American Crystallographic Association, 1998-present
American Society of Photobiology, 2001
American Society for Biochemistry and Molecular Biology (ASBMB), 2008-present
Sigma Xi Scientific Research Society, 2008-present
Faculty of 1000, 2013-present
American Association for the Advancement of Science, 2017-present

UNIVERSITY AFFILIATIONS

Vanderbilt Center for Structural Biology, 2004-present
Vanderbilt Institute of Chemical Biology, 2005-present
Vanderbilt-Ingram Cancer Center, 2005-present
Vanderbilt Center in Molecular Toxicology, 2006-present
Vanderbilt Center for Matrix Biology, 2007-present
Vanderbilt Chapter of Sigma Xi president, 2012-2014

SERVICE

Professional

Ad Hoc Reviewer: *Nature, Nature Structural and Molecular Biology, Nature Communications, Molecular Cell, Cell Reports, PNAS*, *EMBO Journal*, *Journal of Biological Chemistry*, *Structure*, *Molecular and Cellular Biology*, *Journal of Molecular Biology*, *DNA Repair*, *Chemical Research in Toxicology, PLoS One*, *ACS Chemical Biology*, *Trends in Biochemical Sciences, Nucleic Acids Research*, *Chemical Reviews*, 2004-present
F1000Prime, Structural Biology / Structure: Replication and Repair, Reviewer, 2013-present
NSF Division of Molecular and Cellular Biosciences, *Ad Hoc* Grant Reviewer, 2011-2016
Italian Association for Cancer Research (AIRC), *Ad Hoc* Grant Reviewer, 2014-present
NIH Macromolecular Structure and Function A (MSFA) Study Section, *Ad Hoc* Member, 2015-2016
NIH NCI Program Project P01 Special Emphasis Review Panel ZCA1 RPRB-F (O1), 2016
NIH Macromolecular Structure and Function C (MSFC) Study Section, *Ad Hoc* Member, 2017
NIH NCI Program Project P01 Special Emphasis Review Panel ZCA1 RTRB-E (O1), 2018

Educational Testing Service GRE Biochemistry Subject Test, Author and Reviewer, 2007-2016
14th Annual NIEHS Biomedical Career Fair, Research Triangle Park, NC, Panel member, 2011
FASEB Science Research Conference, *Machines on Genes: Nucleic Acid Enzymes*, Co-Organizer, 2014
Southeast Regional Meeting of the American Chemical Society, *Frontiers in Nucleic Acids Symposium*, Co-Organizer, 2014
NSF Award 1623280, Enhancement of the Life Sciences Curriculum at Fisk University, External Advisory Board member, 2016-present

University

Vanderbilt-Ingram Cancer Center, ACS Institutional Research Grant Committee, 2009-2012
College of Arts & Science Curriculum Committee, 2011-2015 (Chair, 2014-2015)
Vanderbilt Chapter of Sigma Xi President, 2012-2014
Chancellor's Academic Planning Group for Trans-Institutional Programs, 2013
Undergraduate Program in Biochemistry and Chemical Biology, Co-Developer, 2013-2016
Undergraduate Program in Biochemistry and Chemical Biology, Founding Co-Director, 2016-2019
Senior Advisory Review Committee, 2016-2017
Department of Pathology, Microbiology, and Immunology Chair Search Committee, 2019-2020

Molecular Biophysics Training Grant Seminar Series Coordinator, 2006-2007
Molecular Biophysics Training Grant Executive Committee, 2007-2013
X-ray Crystallography Users Committee Co-Chair, 2008-2013
Karpay Award in Structural Biology Selection Committee, 2012-2015
Molecular Biophysics Training Grant Education Committee, 2013-present
Training Program in Environmental Toxicology (T32) Advisory Committee, 2013-2015
Vanderbilt Institute of Chemical Biology Operating Committee, 2018-2019

Department

Department of Biological Sciences Undergraduate Advisor, 2004-present
Department of Biological Sciences Graduate Program Committee, 2005-2007, 2013-2016
Department of Biological Sciences Interdisciplinary Graduate Program Representative, 2007-2013
Department of Biological Sciences Faculty Search Committees, 2012-13 (chair), 2013-14, 2014-15
Departments of Biological Sciences and Chemistry Faculty Search Committee Co-Chair, 2016-17

RESEARCH PUBLICATIONS

1. Mooers BHM, **Eichman BF**, and Ho PS (1997) The structures and relative stabilities of d(G·G) reverse Hoogsteen, d(G·T) reverse wobble, and d(G·C) reverse Watson-Crick base-pairs in DNA crystals. *J Mol Biol*., 269: 796-810.
2. **Eichman BF**, Schroth GP, Basham B, and Ho PS (1999) The intrinsic structure and stability of out-of-alternation base pairs in Z-DNA. *Nucleic Acids Res*, 27: 543-550.
3. **Eichman BF**, Vargason JM, Mooers BHM, and Ho PS (2000) The Holliday junction in an inverted repeat sequence: Sequence effects on the structure of four-way junctions. *Proc Nat Acad Sci, USA*, 97: 3971-3976.
4. Vargason JM, **Eichman BF**, and Ho PS (2000) E-DNA: An extended, eccentric structure induced by cytosine methylation and bromination. *Nat Struct Biol,* 7: 758-761.
5. **Eichman BF**, Mooers BHM, Alberti M, Hearst JE, and Ho PS (2001) The crystal structures of psoralen cross-linked DNA: Drug dependent formation of Holliday junctions. *J Mol Biol*, 308: 15-26. (*cover article*)
6. **Eichman BF**, Ortiz-Lombardía M, Aymamí J, Coll M, and Ho PS (2002) The inherent properties of DNA four-way junctions: Comparing the crystal structures of Holliday junctions. *J Mol Biol*, 320: 1037-1051. (*cover article*)
7. **Eichman BF**, O'Rourke EJ, Radicella JP, and Ellenberger T (2003) Crystal structures of 3-methyladenine DNA glycosylase MagIII and the recognition of alkylated bases. *EMBO J*, 22: 4898-4909. (*Faculty of 1000 Recommended*)
8. Brieba LG, **Eichman BF**, Kokoska RJ, Doublié S, Kunkel TA, and Ellenberger T (2004) Structural basis for the dual coding potential of 8-oxoguanosine during nucleotide insertion and elongation by a high fidelity DNA polymerase. *EMBO J*, 23: 3452-3461.
9. Metz AH, Hollis T, and **Eichman BF** (2007) DNA damage recognition and repair by 3-methyladenine DNA glycosylase I (TAG). *EMBO J,* 26: 2411-2420.
10. Robertson PD*, Warren EM*, Zhang H*, Friedman DB, Lary JW, Cole JL, Tutter AV, Walter JC, Fanning E, and **Eichman BF** (2008) Domain architecture and biochemical characterization of vertebrate Mcm10. *J Biol Chem*, 283: 3338-3348.
11. Rubinson EH, Metz AH, O'Quin J, and **Eichman BF** (2008) A new protein architecture for processing alkylation damaged DNA: The crystal structure of DNA glycosylase AlkD. *J Mol Biol*, 381: 13-23.
12. Bowles T*, Metz AH*, O'Quin J, Wawrzak Z, and **Eichman BF** (2008) Structure and DNA binding of alkylation response protein AidB. *Proc Natl Acad Sci USA*, 105: 15299-15304.
13. Warren EM, Vaithiyalingam S, Haworth J, Greer B, Bielinsky AK, Chazin WJ, and **Eichman BF** (2008) Structural basis for DNA binding by replication initiator Mcm10. *Structure*, 16: 1892-1901. (*cover article, Faculty of 1000 Must Read*)
14. Warren EM, Huang H, Fanning E, Chazin WJ, and **Eichman BF** (2009) Physical interactions between Mcm10, DNA, and DNA polymerase α. *J Biol Chem*, 284: 24662-24672.
15. Robertson PD, Chagot B, Chazin WJ*, and **Eichman BF*** (2010) Solution NMR structure of the C-terminal DNA binding domain of Mcm10 reveals a conserved MCM motif. *J Biol Chem*, 285: 22942-22949. (*co-corresponding author)
16. Vaithiyalingam S, Warren EM, **Eichman BF*,** Chazin WJ* (2010) Insights into eukaryotic DNA priming from the structure and functional interactions of the 4Fe-4S cluster domain of human DNA primase.

Proc Natl Acad Sci USA, 107: 13684-13689. (*co-corresponding author) (*Faculty of 1000 Recommended*)

17. Mok YG, Uzawa R, Lee J, Weiner GW, **Eichman BF**, Fischer RL, and Huh JH (2010) Domain structure of the DEMETER 5-methylcytosine DNA glycosylase. *Proc Natl Acad Sci USA*, 107: 19225-19230.
18. Rubinson EH, Gowda AS, Spratt TE, Gold B, and **Eichman BF** (2010) An unprecedented nucleic acid capture mechanism for excision of DNA damage. *Nature*, 468: 406-411.
    - Spotlight in *Chem Res Toxicol.* 2011, 24: 4-5 (DOI: 10.1021/tx1004024)
    - *ScienceDaily*, 5 Oct. 2010
    - Argonne National Laboratory highlight, Dec, 2010
    - Faculty of 1000 highlight
19. Adhikary S and **Eichman BF** (2011) Analysis of substrate specificity of *Schizosaccharomyces pombe* Mag1 Alkylpurine DNA Glycosylase. *EMBO Rep*, 12: 1286-92.
20. Bétous R, Mason AC, Rambo RP, Bansbach CE, Badu-Nkansah A, Sirbu BM, **Eichman BF**, and Cortez D (2012) SMARCAL1 catalyzes fork regression and Holliday junction migration to maintain genome stability during DNA replication. *Genes Dev*, 26:151-62.
21. Shi M, Pedchenko V, Greer BH, Van Horn WD, Santoro SA, Sanders CR, Hudson BG, **Eichman BF**, Zent R, Pozzi A (2012) Enhancing integrin α1 I-domain affinity to ligand potentiates integrin α1β1-mediated downregulation of collagen synthesis. *J Biol Chem*, 287:35139-52.
22. Adhikary S, Cato MC, McGary K, Rokas A, and **Eichman BF** (2013) Non-productive DNA damage binding by glycosylase-like protein Mag2 from *Schizosaccharomyces pombe*. *DNA Repair*, 12: 196-204. (*Faculty of 1000 Recommended*)
23. Bétous R, Couch FB, Mason AC, **Eichman BF**, Manosas M.*, and Cortez D* (2013) Substrate-selective repair and restart of replication forks by DNA translocases. *Cell Rep*, 3: 1958-1969.
24. Du W, Josephrajan A, Adhikary S, Bowles T, Bielinsky AK, and **Eichman BF** (2013) Mcm10 self-association is mediated by an N-terminal coiled-coil domain. *PLoS One*, 8: e70518.
25. Mullins EA*, Rubinson EH*, Pereira KN, Calcutt MW, Christov PP, and **Eichman BF** (2013) An HPLC-tandem mass spectrometry method for simultaneous detection of alkylated base excision repair products. *Methods*, 64: 59-66.
26. Rubinson EH, Christov PP, and **Eichman BF** (2013) Depurination of *N*7-methylguanine by DNA glycosylase AlkD is dependent on the DNA backbone. *Biochemistry*, 52: 7363-7365.
    - Spotlight in *Chem Res Toxicol*, 2013, 26: 1776-1777
    - #1 most downloaded article in *Biochemistry*, Oct 2013
27. Vaithiyalingam S, Arnett DR, Aggarwal A, **Eichman BF**, Fanning E*, and Chazin WJ* (2014) Insights into eukaryotic priming from structures of the p48 subunit of human DNA primase in pre-catalytic conformations. *J Mol Biol*, 426: 558-69.
28. Mullins EA*, Rubinson EH*, and **Eichman BF** (2014). The substrate binding interface of alkylpurine DNA glycosylase AlkD. *DNA Repair*, 13: 50-54.
29. Brooks SC, Fischer RL, Huh JH, and **Eichman BF** (2014) 5-methylcytosine recognition by *Arabidopsis thaliana* DNA glycosylases DEMETER and DML3. *Biochemistry*, 53: 2525-2532.
30. Jang H, Shin H, **Eichman BF**, Huh JH (2014) Excision of 5-hydroxymethylcytosine by DEMETER family DNA glycosylases. *Biochem Biophys Res Commun,* 446: 1067-1072.
31. Troll CJ, Adhikary S, Mitra I, **Eichman BF**, and Camps M (2014) Interplay between base excision repair activity and toxicity of 3-methyladenine DNA glycosylases in an *E. coli* complementation system. *Mutat Res*, 763-764: 64-73.
32. Feldkamp MD, Mason AC, **Eichman BF**, Chazin WJ (2014) Structural analysis of RPA recruitment of the DNA damage response protein SMARCAL1. *Biochemistry*, 53:3052-3061.
33. Mason AC, Rambo RP, Greer B, Pritchett M, Tainer JA, Cortez D, and **Eichman BF** (2014) A structure-specific nucleic acid-binding domain conserved among DNA repair proteins. *Proc Natl Acad Sci USA,* 111: 7618-7623.

34. Szulik MW, Pallan PS, Nocek B, Voehler M, Banerjee S, Brooks SC, Joachimiak A, Egli M, **Eichman BF**, and Stone MP (2015) Differential stabilities and sequence-dependent base pair opening dynamics of Watson-Crick base pairs with 5-hydroxymethylcytosine, 5-formylcytosine, and 5-carboxylcytosine. *Biochemistry*, 54:1294-305.

35. Mullins EA, Shi R, Kotsch LA, and **Eichman BF** (2015) A New Family of HEAT-Like Repeat Proteins Lacking a Critical Substrate Recognition Motif Present in Related DNA Glycosylases. *PLoS One*, 10:e0127733.

36. Kile AC, Chavez DA, Bacal J, Eldirani S, Korzhnev DM, Bezsonova I, **Eichman BF***, Cimprich KA* (2015) HLTF's Ancient HIRAN Domain Binds 3′-DNA Ends to Drive Replication Fork Reversal. *Mol Cell*, 58: 1090-1100. (* co-corresponding author)
    - Preview: Tsutakawa SE and Tainer JA (2015) Bending Forks and Wagging Dogs—It's about the DNA 3′ Tail. *Mol Cell*, 58: 972-973.

37. Mullins EA, Shi R, Parsons ZD, Yuen PK, David SS, Igarashi Y, and **Eichman BF** (2015) The DNA glycosylase AlkD uses a non-base-flipping mechanism to excise bulky lesions. *Nature*, 527: 254-258.
    - News & Views: Shin DS and Tainer JA (2015) Molecular biology: DNA repair without flipping out. *Nature*, 527: 168-169.
    - Faculty of 1000 highlight
    - *ScienceDaily*, 29 Oct 2015

38. Meyer PA, Socias S, Key J, Ransey E, Tjon EC, Buschiazzo A, Lei M, Botka C, Withrow J, Neau D, Rajashankar K, Anderson KS, Baxter RH, Blacklow SC, Boggon TJ, Bonvin AM, Borek D, Brett TJ, Caflisch A, Chang CI, Chazin WJ, Corbett KD, Cosgrove MS, Crosson S, Dhe-Paganon S, Di Cera E, Drennan CL, Eck MJ, **Eichman BF**, Fan QR, Ferré-D'Amaré AR, Fromme JC, Garcia KC, Gaudet R, Gong P, Harrison SC, Heldwein EE, Jia Z, Keenan RJ, Kruse AC, Kvansakul M, McLellan JS, Modis Y, Nam Y, Otwinowski Z, Pai EF, Pereira PJ, Petosa C, Raman CS, Rapoport TA, Roll-Mecak A, Rosen MK, Rudenko G, Schlessinger J, Schwartz TU, Shamoo Y, Sondermann H, Tao YJ, Tolia NH, Tsodikov OV, Westover KD, Wu H, Foster I, Fraser JS, Maia FR, Gonen T, Kirchhausen T, Diederichs K, Crosas M, Sliz P (2016) Data publication with the structural biology data grid supports live analysis. *Nat Commun*, 7:10882.

39. Badu-Nkansah A, Mason AC, **Eichman BF**, Cortez D (2016) Identification of a Substrate Recognition Domain in the Replication Stress Response Protein Zinc Finger RAN-binding Domain Containing 3 (ZRANB3). *J Biol Chem*, 291: 8251-7.

40. Parsons ZD, Bland JM, Mullins EA, and **Eichman BF** (2016) A catalytic role for C-H/π interactions in base excision repair by *Bacillus cereus* DNA glycosylase AlkD. *J Am Chem Soc*, 138: 11485-8.

41. Mullins EA, Warren GM, Bradley NP, **Eichman BF** (2017) Structure of a DNA glycosylase that unhooks interstrand cross-links. *Proc Natl Acad Sci USA*, 114: 4400-4405.

42. Mullins EA, Shi R, and **Eichman BF** (2017) Toxicity and repair of DNA adducts produced by the natural product yatakemycin. *Nat Chem Biol*, 13: 1002-1008.
    - Viewpoint: Herzon SB (2018) DNA Repair: Unconventional Lesions Require Unconventional Repair. *Biochemistry*, 57: 1057-8.

43. Shi R, Mullins EA, Shen X, Lay K, Yuen P, David SS, Rokas A, **Eichman BF** (2018) Selective base excision repair of DNA damage by the non-base-flipping DNA glycosylase AlkC. *EMBO J*, 37: 63-74.

44. Chavez DA, Greer BH, **Eichman BF** (2018) The HIRAN domain of helicase-like transcription factor positions the DNA translocase motor to drive efficient DNA fork regression. *J Biol Chem*, 293: 8484-94.

45. Warren GM, Stein RA, Mchaourab HS, and **Eichman BF** (2018) Movement of the RecG motor domain upon DNA binding is required for efficient DNA fork reversal. *Int J Mol Sci*, 19: 3049.

46. Mohni KN, Wessel SR, Zhao R, Wojciechowski AC, Luzwick JW, Layden H, **Eichman BF**, Thompson PS, Mehta KPM, Cortez D (2019) HMCES maintains genome integrity by shielding abasic sites in single strand DNA. *Cell*, 176: 144-153.

47. Steenwyk JL, Opulente DA, Kominek J, Shen X, Zhou X, Labella AL, Bradley NP, **Eichman BF**, Čadež N, Libkind D, DeVirgilio J, Hulfachor AB, Kurtzman CP, Hittinger CT*, and Rokas A*. (2019) Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeasts. *PLOS Biology*, 17:e3000255

48. Thompson PS[§], Amidon KM[§], Mohni KN, Cortez D*, and **Eichman BF***. (2019) Protection of abasic sites during DNA replication by a stable thiazolidine protein-DNA crosslink. *Nat Struct Mol Biol*, 26: 613-618
49. Paulson CN, John K, Baxley RM, Kurniawan F, Kurahashi K, Francis R, Sobeck A, **Eichman BF**, Chazin WJ, Aihara H, Georg GI, Hawkinson JE, and Bielinsky AK. (2019) The anti-parasitic agent suramin and several of its analogs are inhibitors of the DNA binding protein Mcm10. *Open Biol*, 9: 190117

REVIEW ARTICLES (Peer-Reviewed)

50. Ho PS* and **Eichman BF** (2001) The crystal structures of DNA Holliday junctions. *Curr Op Struct Biol*, 11: 302-308. (*corresponding author) (*Invited review*)
51. Rubinson EH and **Eichman BF** (2012) Nucleic acid recognition by tandem helical repeats. *Curr Op Struct Biol*, 22: 101-109. (*Invited review*)
52. Brooks SC, Adhikary S, Rubinson EH, and **Eichman BF** (2013) Recent Advances in the Structural Mechanisms of DNA Glycosylases. *Biochem Biophys Acta – Proteins and Proteomics*, 1834: 247-271. (*Invited review*)
53. Shi R, Shen X, Rokas A, and **Eichman BF** (2018) Structural biology of the HEAT-like repeat family of DNA glycosylases. *BioEssays*, 40: 1800133. (*Invited review*)
54. Mullins EA, Rodriguez AA, Bradley NP, and **Eichman BF** (2019) Emerging roles of DNA glycosylases and the base excision repair pathway. *Trends in Biochemical Sciences*, 44: 765-781 (*Invited review, cover article*)

BOOK CHAPTERS (Indicates Peer-Reviewed)**

55. Basham B, **Eichman BF**, and Ho PS (1999) The single crystal structures of Z-DNA. In Neidle, S. (ed.), *The Oxford Handbook of Nucleic Acid Structure*. Oxford University Press, Oxford, UK, Vol. 1, pp. 199-252.
56. ** Rubinson EH, Adhikary, S, and **Eichman BF** (2010) Structural studies of alkylpurine DNA glycosylases. In Stone, M.P. (ed.), *ACS Symposium Series: Structural Biology of DNA Damage and Repair*. American Chemical Society, Washington, D.C., Vol. 1041, pp. 29-45.
57. Du W, Stauffer M, and **Eichman BF** (2012) Structural biology of replication initiation factor Mcm10. In MacNeill, S. (ed.), *The Eukaryotic Replisome: A Guide to Protein Structure and Function*. Springer Publishing Company, New York. *Subcell Biochem*, 62:197-216.

PREVIEWS / NEWS & VIEWS

58. **Eichman BF** and Fanning E (2004) The power of pumping together; deconstructing the engine of a DNA replication machine. *Cell*, 119: 3-4.
59. Camps M and **Eichman BF** (2011) Unraveling a connection between DNA demethylation repair and cancer. *Mol Cell*, 44: 343-4.
60. **Eichman BF** (2017) Preface. *Methods Enzymol*, 591: xv-xvii and 592: xvii-xx.

EDITED VOLUMES

1. **Eichman BF**, ed. (2017) *Methods in Enzymology, Vol. 591. DNA Repair Enzymes: Cell, Molecular, and Chemical Biology*. London: Academic Press.
2. **Eichman BF**, ed. (2017) *Methods in Enzymology, Vol. 592*. *DNA Repair Enzymes: Structure, Biophysics, and Mechanism*. London: Academic Press.

FUNDING

Active

NIH R01 GM117299 (Eichman)

Mechanisms of Replication Fork Repair
01/01/16 – 12/31/19, $1,239,460 total / $790,000 direct
Role: PI, 17% effort

NSF MCB-1928918 (Eichman)
DNA Repair Mechanisms of Self-Resistance to Genotoxic Secondary Metabolites
09/01/19 – 08/31/23, $1,320,000 total / $844,563 direct
Role: PI, 8.3% effort

NIH / NCI P01 CA092584 (Tainer)
Structural Cell Biology of DNA Repair Machines
09/01/16 – 08/31/21, $19,616,540 total / $11,367,715 direct
Project 2: Replication Fork Repair and Signaling (Cortez)
$2,151,820 total / $1,405,000 direct ($175,000 direct to Eichman lab)
Role: Sr. Investigator, 8% effort

NIH R01 ES030575-A1 (Cortez)
Functions of SRAP domain proteins in DNA metabolism
04/01/19 – 03/31/24, $2,875,809 total / $190,230 direct to Eichman lab
Role: Co-Investigator, 10% effort

Pending

NIH R01 GM131071-A1 (Eichman)
Mechanisms of DNA glycosylase mediated interstrand crosslink repair
07/01/19 – 06/30/23, $2,254,950 total / $1,574,741 direct
Role: PI, 16.7% effort

Submitted

NIH R35 GM136401 (Eichman)
Structural Biology of the DNA Replication Stress Response
01/01/20 – 12/31/24, $2,765,348 total / $1,746,738 direct
Role: PI, 26.5% effort

Completed

Extramural as PI

NSF MCB-1517695
A New Structural Architecture for Recognition of DNA Damage
08/01/15 – 07/31/19, $660,000 total / $420,382 direct
Role: PI, 12.5% effort

NSF MCB-1122098, A New Structural Architecture for DNA Processing
08/15/11 – 07/31/15 (1-year NCE), $690,000 / $446,888 direct
Role: PI, 12.5% effort

NIH / NIGMS R01 GM080570, Structural Mechanisms of Mcm10 in DNA Replication
04/15/07 – 03/31/13 (2-year NCE), $1,121,279 / $737,917 direct
Role: PI, 28% effort

American Cancer Society RSG-07-063-01-GMC, Structural Basis for Repair of DNA Alkylation Damage
01/01/07 – 12/31/11 (1-year NCE), $719,000 / $600,000 direct
Role: PI, 25% effort

NIH / NIGMS F32 GM065714, Structural Studies of DNA Repair Proteins
Ruth L. Kirschstein National Research Service Award, Postdoctoral Fellowship
03/20/02 – 04/30/04, $86,468 direct
Role: PI

Extramural as co-Investigator

NIH / NIEHS F32 ES027332 (Parsons)

Preparation and biophysical characterization of cationic methylpurine lesions and their role in damage recognition by DNA glycosylases
09/01/16-08/31/17, $56,118 total costs
NRSA Postdoctoral Fellowship
Role: Mentor

NIH / NIEHS R01 ES019625 (Camps)
Mechanisms of Selective Excision and Oxidative Repair of Alkylated DNA
07/25/11 – 06/30/17 (NCE), $1,692,809 total / $1,408,037 direct ($534,147 direct to Eichman lab)
Role: co-PI, 17% effort

NIH / NIGMS R01 GM065484 (Chazin)
Structural Basis for RPA and DNA Primase Functions
01/01/12 - 12/31/16 NCE, $1,344,720 total / $862,000 direct
Role: co-Investigator, 5% effort cost-shared

ACS PF-12-220-01-DMC (Mason)
Structural Mechanisms of Smarcal1 Mediated Replication Fork Stabilization
07/01/12 – 06/30/15, $150,000 direct costs
Postdoctoral Fellowship
Role: Mentor

NIH P01 DK065123 (Hudson), Cell-Matrix Interactions in the Glomerulus
Project 2: The Role of Integrins α1β1 and α2β1 in Collagen IV Homeostasis (PI, Ambra Pozzi)
07/18/08 – 06/30/13, P01: $5,502,855 (P01 total); Project 2: $1,229,660 total / $850,000 direct
Role: co-Investigator, 6% effort

NIH S10 RR024687 (Chazin), Acquisition of an Analytical Ultracentrifuge
12/13/08 – 11/30/09, $341,531
Role: Major user

NIH S10 RR025677 (Sanders), Console Upgrades for Biological NMR Spectrometers
05/18/09 – 05/17/10, $459,900
Role: Minor user

Intramural

Vanderbilt University Interdisciplinary Discovery Grant (Eichman, Chazin, Ohi)
Coordination of RNA and DNA Synthesis Activities in Polymerase α-Primase
07/01/15 – 06/30/17, $100,000 total direct
Role: co-PI

Vanderbilt Center in Molecular Toxicology Pilot Project Grant (P30 ES000267, PI, Guengerich)
Structural Studies of DNA Damage Response Protein Smarcal1
04/01/11 – 03/31/12, $37,500 direct
Role: PI

Vanderbilt University, Interdisciplinary Discovery Grant (Eichman, Gamse)
Structural Basis for Regulation of Asymmetric Brain Development
05/01/10 – 06/30/12, $95,000 total direct
Role: Co-PI

Vanderbilt University Discovery Grant (Friedman)
Structure/Function Analysis of the Est3 Protein of Yeast Telomerase
05/01/07 – 06/30/09, $50,000 direct
Role: Co-Investigator, 5% effort

Vanderbilt University Discovery Grant (Eichman)
Molecular Mechanism of Eukaryotic DNA Replication Initiation
05/01/05 – 06/30/07, $48,000 direct

Role: PI

Vanderbilt Center for Molecular Toxicology Pilot Project Grant (P30 ES000267, PI, Guengerich)
Molecular Mechanism of Eukaryotic DNA Replication Initiation
04/01/05 – 03/31/06, $40,000 direct
Role: PI

Vanderbilt-Ingram Cancer Center Pilot Award (Eichman)
American Cancer Society Institutional Research Grant (ACS IRG-58-009-47, PI, Jennifer Pietenpol)
Structural Studies of DNA Repair Proteins
07/01/05 – 06/30/06, $20,000 direct
Role: PI

INVITED ACADEMIC LECTURES

2003 Boston DNA Repair and Mutagenesis Group. Massachusetts Institute of Technology, Boston, MA
2003 Department of Biochemistry and Molecular Biology, University of Maryland School of Medicine, Baltimore, MD
2004 Department of Molecular Biology, Cell Biology, & Biochemistry, Brown University, Providence, RI
2004 Department of Biochemistry & Molecular Biology, University of Connecticut, Storrs, CT
2004 Department of Biological Sciences, Vanderbilt University, Nashville, TN
2007 Department of Biochemistry and Molecular Biology, University of Maryland School of Medicine, Baltimore, MD.
2008 Department of Biochemistry & Molecular Biology, Pennsylvania State University School of Medicine, Hershey, PA
2009 Department of Biochemistry and Molecular Biology, Colorado State University, Fort Collins, CO
2009 Department of Biological Chemistry, University of Michigan, Ann Arbor, MI
2010 Sigma Xi Annual Banquet, Vanderbilt University Chapter, Nashville, TN
2011 Vanderbilt Institute of Chemical Biology, Vanderbilt University, Nashville, TN
2011 Department of Chemistry, Vanderbilt University, Nashville, TN
2011 Department of Biochemistry and Molecular Biology, University of Arkansas for Medical Sciences, Little Rock, AR
2012 Department of Chemistry, University of Alabama at Birmingham
2013 Department of Microbiology and Environmental Toxicology, University of California, Santa Cruz
2013 Department of Biochemistry, Molecular Biology, & Biophysics, University of Minnesota, Minneapolis, MN
2013 Laboratory of Structural Biology Annual Retreat, National Institute of Environmental Health Sciences, Durham, NC
2014 Department of Structural Biology, St. Jude Children's Research Hospital, Memphis, TN
2014 Life-Sciences Collaborative Access Team, Advanced Photon Source, Argonne National Laboratory, Chicago, IL
2014 Department of Biochemistry and Molecular Biology, University of Chicago
2015 Department of Biology, Technische Universität, Darmstadt, Germany
2015 Department of Chemistry, Ludwig-Maximilians-Universität, Munich, Germany
2015 Institute of Chemical Biology, Colorado State University, Fort Collins, CO
2015 Department of Biochemistry & Molecular Biology, Belmont University, Nashville, TN
2015 NIEHS Training Program in Environmental Health Sciences, University of California, Davis
2016 Department of Molecular & Cellular Biochemistry, Indiana University, Bloomington, IN
2016 Department of Microbiology and Physiological Systems, University of Massachusetts Medical School, Worcester, MA
2017 Department of Microbiology and Environmental Toxicology, University of California, Santa Cruz
2017 Department of Molecular Medicine, Cornell University, Ithica, NY

2017 Department of Chemistry and Biochemistry, Baylor University, Waco, TX
2017 Department of Biochemistry and Biophysics, George W. Raiziss Biochemical Rounds, University of Pennsylvania, Philadelphia, PA.
2018 Department of Biochemistry, Wake Forest School of Medicine, Winston-Salem, NC
2018 Department of Medicinal Chemistry, University Of Minnesota, Minneapolis, MN
2018 Department of Chemistry and Biochemistry, The Ohio State University, Columbus, OH
2018 Department of Genetics and Biochemistry, Clemson University, Clemson, SC
2018 Department of Biochemistry & Structural Biology, University of Texas Health Science Center, San Antonio, TX
2019 Department of Radiation Oncology, University of Texas Southwestern Medical Center, Dallas, TX
2019 Department of Biophysics, University of Texas Southwestern Medical Center, Dallas, TX
2019 Department of Chemistry, Yale University, New Haven, CT
2020 (scheduled) Department of Chemistry, Texas A&M University, College Station, TX

INVITED CONFERENCE LECTURES

1998 American Crystallographic Association Annual Meeting, Arlington, VA
2000 13th Annual International Congress of Photobiology, San Francisco, CA
2006 36th Mid-Atlantic Macromolecular Crystallography Meeting, Winston-Salem, NC
2008 236th American Chemical Society National Meeting, Philadelphia, PA
2008 The Southeastern Regional Meeting of the American Chemical Society, Nashville, TN
2009 237th American Chemical Society National Meeting, Salt Lake City, UT
2009 SBGrid Annual Meeting and Computing School, Harvard Medical School, Boston, MA
2009 American Society for Microbiology Conference on DNA Repair and Mutagenesis, Whistler, Canada
2009 Sigma Xi Annual Meeting and International Research Conference, The Woodlands, TX
2010 FASEB Science Research Conference: Nucleic Acid Enzymes, Vermont Academy, Saxtons River, VT (unable to attend)
2010 Danforth Plant Science Center 12th Annual Fall Symposium, St, Louis, MO
2010 Zing Conference: Nucleic Acids, Puerto Morelos, Mexico
2011 Argonne National Laboratory Annual Users Meeting, Argonne, IL (***keynote address***)
2012 FASEB Science Research Conference: Nucleic Acid Enzymes, Snowmass Village, CO
2012 Meeting of the American Crystallographic Association, Boston, MA
2012 Zing Conference: Nucleic Acids, Xcaret, Mexico
2013 Gordon Research Conference: Nucleic Acids, University of New England, Biddeford, ME
2013 Southeast Regional Meeting of the American Chemical Society, Atlanta, GA
2014 Fusion Conference: Dynamic Structures in DNA Damage Responses and Cancer, Cancun, Mexico
2014 Zing Conference: Nucleic Acids, Cancun, Mexico
2015 Gordon Research Conference: Nucleic Acids, University of New England, Biddeford, ME
2015 FASEB Science Research Conference: Helicases, Steamboat Springs, CO
2015 Southeast Regional Meeting of the American Chemical Society, Memphis, TN
2016 Fusion Conference: Dynamic Structures in DNA Damage Responses and Cancer, Cancun, Mexico
2016 Biochemical Society 80th Harden Conference: Machines on Genes IV, Macclesfield, UK
2016 Meeting of the American Crystallographic Association, Denver, CO (unable to attend)
2016 Zing Conference: Nucleic Acids, Tampa, FL
2017 Gordon Research Conference: RNA Editing—Biology and Mechanisms of RNA and DNA Modification, Ventura, CA
2017 Gordon Research Conference: Nucleic Acids, University of New England, Biddeford, ME
2017 EMBO/Harden Conference: Helicases and Nucleic Acid-Based Machines, Kloster Banz, Germany
2018 Fusion Conference: DNA Replication and Repair Structures and Cancer, Cancun, Mexico

2018 Midwest Chromatin and Epigenetics Meeting, Purdue University (unable to attend)
2018 ASBMB Annual Meeting Spotlight Session, San Diego, CA (unable to attend)
2018 DNA Repair Symposium honoring Susan Wallace, University of Vermont, Burlington, VT
2019 Gordon Research Conference: Nucleic Acids, Sunday River Resort, ME
2019 Meeting of the American Crystallographic Association, Cincinnati, OH
2020 (Scheduled) Telluride Workshop on Nucleic Acid Chemistry, Telluride, CO

STUDENT & POSTDOC AWARDS

1. Audrey (Herrin) Metz, Vanderbilt University Summer Research Program Fellowship, 2005
2. Audrey (Herrin) Metz, First Prize Best Poster Award, Vanderbilt Institute of Chemical Biology Annual Retreat. Nashville, TN, July 2006
3. Audrey (Herrin) Metz, Award for Outstanding Research in Biological Sciences, Vanderbilt University, 2006
4. Eric M. Warren, Ann Bernard Martin Award (demonstrating exceptional promise in research), Vanderbilt University Department of Biological Sciences, 2006
5. Eric M. Warren, Gisela Mosig Outstanding Graduate Student Presenter Award, Vanderbilt University Department of Biological Sciences Annual Retreat. Chapel Hill, TN, Oct 2007
6. Eric M. Warren, Best Poster Award, 38th Mid-Atlantic Crystallography Meeting, Chapel Hill, NC, 2008
7. Emily H. Rubinson, Second Prize Best Poster Award, Vanderbilt Institute of Chemical Biology Annual Retreat. Nashville, TN, Aug 2008
8. Emily H. Rubinson, Student Travel Award, ASM Conference on DNA Repair and Mutagenesis: From Molecular Structure to Human Disease. Whistler, Canada, May 2009
9. Emily H. Rubinson, Second Prize Best Poster Award, Vanderbilt Institute of Chemical Biology Annual Retreat. Nashville, TN, Aug 2009
10. Emily H. Rubinson, Gisela Mosig Outstanding Graduate Student Presenter Award, Vanderbilt University Department of Biological Sciences Annual Retreat. Oct 2009
11. Emily H. Rubinson, Best Poster Award (co-winner), FASEB Science Research Conference: Nucleic Acid Enzymes. Vermont Academy, Saxtons River, VT, June 2010
12. Emily H. Rubinson, Best Oral Presentation Award, Vanderbilt Institute of Chemical Biology Annual Retreat. Nashville, TN, Aug 2010
13. Suraj Adhikary, Second Prize Best Poster Award, Vanderbilt Institute of Chemical Biology Annual Retreat. Nashville, TN, Aug 2010
14. Sonja Brooks, NSF Predoctoral Fellowship, 2010-2013
15. Claire Cato, Dean's Beckman Scholar, Vanderbilt University, 2012-13, $19,300 direct costs
16. Michael Pritchett, Vanderbilt University Summer Research Program Fellowship, 2012
17. Aaron Mason, American Cancer Society Postdoctoral Fellowship, 2012-2015, $150,000 direct costs
18. Aaron Mason, NIH NRSA Postdoctoral Fellowship, 2012, declined
19. Claire Cato, Vanderbilt nominee for Goldwater Scholarship, 2013
20. Claire Cato, Beckman Scholars Symposium, July 25-27, 2013, Irvine, CA, invited speaker
21. Lyla Kotsch, Vanderbilt University Summer Research Program Fellowship, 2014
22. Diana (Tafoya) Chavez, Ann Bernard Martin Award, Vanderbilt Dept of Biological Sciences, 2014
23. Elwood Mullins, Leon W. Cunningham Outstanding Postdoctoral Fellow Award, Vanderbilt Dept of Biochemistry, 2016
24. Elwood Mullins, ASBMB Annual Meeting, Selected Talk, Chicago, IL, 2016
25. Elwood Mullins, Meeting of the American Crystallographic Association, Travel Award, 2016
26. Zachary Parsons, NIH NRSA Postdoctoral Fellowship, 2016-17, $56,118 total costs
27. Kristen Gardner, ABRCMS 2016 Presentation Award, Annual Biomedical Research Conference for Minority Students, 2016
28. Elwood Mullins, Vanderbilt Ingram Cancer Center Postdoc of the Year, 2017
29. Rongxin Shi, Vanderbilt Institute of Chemical Biology Symposium, poster award, 2017

30. Alyssa Rodriguez, NSF Graduate Research Fellowship, 2018-20
31. Noah Bradley, NSF Graduate Research Fellowship, 2018-20
32. Katherine Amidon, NSF Graduate Research Fellowship, Honorable Mention, 2019
33. Noah Bradley, Ann Bernard Martin Award, Vanderbilt Dept of Biological Sciences, 2019

TRAINING GRANT AFFILIATIONS

Molecular Biophysics Training Grant, NIH T32 GM008320
Vanderbilt Training Program in Environmental Toxicology, NIH T32 ES07028
Biochemical and Chemical Training for Cancer Research NIH T32 CA009582
Vanderbilt Chemistry-Biology Interface Training Grant NIH T32 GM065086
Medical Scientist Training Program, NIH T32 GM007347
Viruses, Nucleic Acids and Cancer, NIH T32 CA009385 (past)

TEACHING

BSCI 2520, Biochemistry. Structure and mechanism of action of biological molecules, proteins, nucleic acids, lipids, and polysaccharides. Enzymology. Carbohydrate metabolism.
- 2010-present, 22 lecture hours, enrollment: 116-149

BSCI 4265/5265, Nucleic Acid Transactions. Biochemistry of the expression, transmission, and maintenance of genetic information. DNA transcription, replication, recombination, and repair.
- 2006-2013, 21 lecture hours, enrollment: 20-36 ** *Revised course* **
- 2014-2018, 42 lecture hours, enrollment: 12-28

BSCI 4274, Proteins. Detailed functional, structural and chemical nature of proteins, biophysical and chemical methods to probe protein structure, and the relationship between protein structure and biological function.
- 2006-2008, 42 lecture hours, enrollment: 9-15 ** *New course* **

BSCI 3850, Independent Reading
- 2004, 1 student

BSCI 3860, Research Internship
- 2011, 1 student

BSCI 3861/3961/4999 Directed/Independent/Honors Research
- 2005-07, 2011-16, mentored 14 students (3 Honors research)
- 2018, coordinator for 3961, enrollment: 30

BSCI 5890: Special Topics in Biological Sciences. 3 hrs. Concurrent with BSCI 2520 Biochemistry
- 2019, 22 lecture hours, 1 student

BSCI 6320, Graduate Seminar in Biological Sciences
- 2005, 2009, 14 lecture hours, enrollment: 13-16

BCHM 8303, Macromolecular X-ray Crystallography
- 2006-2010, 2012, 4-5 lecture hours, enrollment 3-17

BCHM 8336, Biochemical Toxicology & Carcinogenesis
- 2014-present, 2 lecture hours, enrollment: 5-10

BCHM 8349, Graduate Seminar in Molecular Biophysics
- 2005-2010, 2012-2013, 2015, 2017, 1.5 lecture hours, enrollment: 7-16

IGP 300A, Bioregulation: Cell Division and Cancer
- 2009, 2 lecture hours, enrollment: 125

IGP Flex Time, How to read a scientific paper
- 2004-2005, 4 lecture hours, enrollment: 22-25

PERSONNEL SUPERVISED

Postdoctoral Fellows
1. William Wolfle, Ph.D., Nov 2005 – Oct 2007, Viruses and Nucleic Acids Training Grant. Research Associate, Vanderbilt Medical Center
2. Emily Rubinson, Ph.D., Feb 2011 – Aug 2012, Molecular Toxicology Training Grant. Senior Research Scientist, Avon Products, Inc, New York
3. Aaron Mason, Ph.D., Jul 2010 – June 2015, Molecular Toxicology Training Grant, American Cancer Society Postdoctoral Fellow. Senior Staff Scientist, Vanderbilt University
4. Elwood Mullins, Ph.D., Oct 2012 – present, Molecular Toxicology Training Grant
5. Zachary Parsons, Ph.D., Sep 2014 – Aug 2017, Molecular Toxicology Training Grant, NIH F32 NRSA Postdoctoral Fellowship. Analytical Development Chemist, Avecia, Boston, MA
6. Meng Su, Ph.D., Nov 2016 – Oct 2017. Postdoctoral Fellow, Vanderbilt School of Medicine
7. Diana Chavez, Ph.D., Jul 2018 – present, Molecular Toxicology Training Grant
8. Jonathan Dorival, Ph.D., Oct 2018 – present
9. Carl Schiltz, Ph.D., July 2019 – present, Biochemical and Chemical Training for Cancer Research

Graduate Students
1. Eric Warren, Ph.D., Mar 2005 – Jul 2009, Molecular Biophysics Training Grant. Senior Research Technologist, St. Jude Children's Research Hospital, Memphis, TN
2. Patrick Robertson, Ph.D., Nov 2005 – Jun 2010. Director, Program Design, Fujifilm Diosynth Biotechnologies
3. Emily Rubinson, Ph.D., Oct 2006 – Jan 2011, External Technology Lead, R&D Innovation, The Coca-Cola Company, Atlanta, GA
4. Suraj Adhikary, Ph.D., Jan 2008 – Feb 2013, Scientist, Janssen Pharmaceuticals, Spring House, PA
5. Wenyue Du, Ph.D., Apr 2009 – Dec 2013, Technology Transfer Marketing Analyst, Cedars Sinai Medical Center, Los Angeles, CA
6. Sonja (Brooks) Fulmer, Ph.D., Mar 2010 – Jul 2014, Molecular Biophysics Training Grant, NSF Predoctoral Fellow. Regulatory Policy Analyst, Center for Devices and Radiological Health, FDA, Washington, DC
7. Kevin Pereira, Mar 2011 – Jul 2013, Molecular Biophysics Training Grant. Research Assistant, Vanderbilt University.
8. Rongxin Shi, Ph.D., Feb 2013 – May 2018, Sr. Process Development Engineer, Takeda Pharmaceutical Co., Lexington, MA
9. Diana (Tafoya) Chavez, Ph.D., Mar 2013 – Jun 2018, Molecular Biophysics Training Grant. Postdoctoral Scholar, Vanderbilt University
10. Garrett Warren, Ph.D., Apr 2014 – Jun 2019, Molecular Toxicology Training Grant, Postdoctoral Scholar, Memorial Sloan Kettering Cancer Center
11. Noah Bradley, Apr 2017 – present, Molecular Toxicology Training Grant, NSF Graduate Research Fellowship
12. Alyssa Rodriguez, Apr 2017 – present, Molecular Biophysics Training Grant, NSF Graduate Research Fellowship
13. Katherine Amidon, May 2018 – present, Molecular Biophysics Training Grant

Additional Graduate Rotation Students – 21
Graduate Thesis Committees – 58 (11 current; 4 chaired)
Technicians – 18 (1 current)
Undergraduate Students – 26 (14 mentored, 12 co-mentored)
Undergraduate Honors Thesis Committees – 24 (4 as mentor)
Undergraduate Advisees – 40 (4 current)