

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Neal F. Lue	POSITION TITLE		
eRA COMMONS USER NAME (credential, e.g., agency login) NEALLUE	Professor		
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Johns Hopkins University, Baltimore, MD	B.S.	80-84	Natural Sciences
Stanford University School of Medicine, CA	M.D.	84-91	Medicine
	Ph.D.		Cell Biology
Harvard University, Cambridge, MA		91-95	Biochem. Struc. Biol

A. Research Summary

My research focus is to understand the mechanisms of telomere protection and maintenance. We utilize a variety of standard and unorthodox model systems (e.g., *S. cerevisiae*, *Candida*, and *Ustilago*) to investigate the fundamental DNA-protein and protein-protein interactions that govern the assembly of the telomere nucleoprotein complex and that are responsible for the synthesis of telomeric DNA. Over the past two decades, we have analyzed and provided insights on telomerase (responsible for telomere extension), the Cdc13-Stn1-Ten1 complex (responsible for protecting the telomere G-tail), Rap1 (the major duplex telomere binding protein in yeast) and primase-pol α (responsible for telomere C-strand synthesis). More recently, we have switched our focus to the study of human telomeric proteins in order to better translate basic discoveries into telomere-directed cancer therapies.

Our research has been funded by March of Dimes, American Cancer Society, Bohmfalk Charitable Trust, US Army Breast Cancer Research Program, AMDeC (Academic Medicine Development Company), Burroughs Wellcome Fund, Dorothy Rodbell Cohen Foundation for Sarcoma Research, the STARR Cancer Consortium, National Science Foundation, and National Institutes of Health.

B. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

Training and Employment

1984-1990 Graduate student (advisor: Roger D. Kornberg), Department of Cell Biology, Stanford University School of Medicine

1991-1995 Postdoctoral fellow (advisor: James C. Wang), Department of Biochemistry and Molecular Biology, Harvard University

1996-2001 Assistant Professor, Department of Microbiology and Immunology, Weill Medical College of Cornell University

2002-2004 Associate Professor, Department of Microbiology and Immunology, Weill Medical College of Cornell University

2004-2008 Associate Professor with Tenure, Department of Microbiology and Immunology, Weill Medical College of Cornell University

2008-now Professor, Department of Microbiology and Immunology, Weill Medical College of Cornell University

Services and Professional Memberships

1997- Ad hoc reviewers for multiple journals, including *BBA*, *Bioessay*, *Cell Research*, *EMBO J*, *Eukaryotic Cell*, *Experimental Cell Research*, *FEBSLETTERS*, *Gene*, *Genetics*, *J. Biol. Chem.*, *Microbiology*, *Molecular Biology of the Cell*, *Molecular and Cellular Biology*, *Mol. Cell*, *Nature*,

Nature Communications, Nature Medicine, Nature Review Molecular Cell Biology, NSMB, Nucleic Acids Research, PLoS Biology, PLoS Genetics, PLoS One, Proceedings of the National Academy of Sciences, and Structure

- 2001-
2000, 02, 06
2001-2005
2005, 06
2006,10,
2013,14
2007, 2011
2007
2007-2009
2008-2011
2008-2009
2009
2009-2011
2010
2010
2010-2011
2011-
2011-
2012
2013
2014
2015
2015
- Member of AAAS, ASM, ASBMB
Grant reviewer for the U.S. Israel Binational Science Foundation
American Cancer Society Study Section member, Committee on Genetic Mechanisms of Cancer
Temporary Member, NIH study section, Nuclear Dynamics and Transport
Grant reviewer for U.S. National Science Foundation
Grant reviewer for Israel Science Foundation
Grant reviewer for the Wellcome Trust
Member, NIH study section, Nuclear Dynamics and Transport
Chair, Admissions Committee, BCMB program, Weill Graduate School of Medical Sciences
Grant reviewer for New Jersey Commission on Cancer Research
Grant reviewer for Ohio Cancer Research Associates
Member, NIH study section, Nuclear and Cytoplasmic Structure/Function and Dynamics
Ad Hoc Member, NIH ZRG1 F05-C(20) L Fellowship study section
Co-Organizer, Sackler Colloquium, "Telomerase and retrotransposons: reverse transcriptases that shaped genomes"
Guest editor, PNAS, Special focus on "Telomerase and retrotransposons: reverse transcriptases that shaped genomes"
Member, Weill Cornell Cancer Center
Consulting member, Admissions Committee, BCMB program, Weill Graduate School of Medical Sciences
Co-Editor, Monograph entitled "Telomerases: Chemistry, Biology and Clinical Applications", published by John Wiley and Sons
William Randolph Hearst Foundation Endowed Faculty Scholar Award
Reviewer for Yale Cancer Center Pepper Proposal
Reviewer for Wellcome Trust/ DBT India Alliance
Reviewer for Thematic Project Program proposal, Academia Sinica, Taiwan

Honors

- 1983 Junior Phi Beta Kappa
1991 Damon Runyon/Walter Winchell Fellowship (declined)
1991 Life Sciences Research Foundation Fellowship
1996 Basil O'Connor Starter Scholar Award
1999 U.S. Army Breast Cancer Program Idea Award
1999 AMDeC Tartikoff/Perelman/EIF Award for Young Investigators
1999 Concert for the Cure Award
2000 Burroughs Wellcome New Investigator Award in Pathogenic Mycology
2000 Dorothy Rodbell Cohen Foundation for Sarcoma Research
2001 Irma Hirschl-Monique Weill Caulier career development award
2004 ACS TIAA-CREF Award in recognition of contribution to cancer research
2007 Distinguished Visiting Scholar, Academia Sinica, Taiwan
2011 Excellence-in-Teaching Award, Weill Cornell Medical College

C. Peer-reviewed publications (in chronological order).

1. Bram, R.J., Lue, N.F., and Kornberg, R.D. (1986) A GAL family of upstream activation sequences in yeast: roles in both induction and repression of transcription. *EMBO J.* **5**, 603-608.
 2. Sutrina, S.L., Lue, N.F., Chen, G.L., and Chen, W.W. (1987) Effect of dimethyl sulfoxide on transformed rat Schwann cells. *Biochem. Biophys. Acta* **923**, 451-462.
 3. Chen, G.L., Halligan, N.L., Lue, N.F., and Chen, W.W. (1987) Biosynthesis of myelin-associated proteins in simian virus 40 (SV40)-transformed Schwann cell lines. *Brain Res.* **414**, 35-48.
-

4. Lue, N.F., Chasman, D.I., Buchman, A.R., and Kornberg, R.D. (1987) Interaction of GAL4 and GAL80 gene regulatory proteins in vitro. *Mol. Cell. Biol.* **7**, 3446-3451.
 5. Lue, N.F., and Kornberg, R.D. (1987) Accurate initiation at RNA polymerase II promoters in extracts from *Saccharomyces cerevisiae*. *Proc. Natl. Acad. Sci. USA* **84**, 8839-8843.
 6. Fedor, M.J., Lue, N.F., and Kornberg, R.D. (1988) Statistical positioning of nucleosomes by specific protein binding to an upstream activating sequence in yeast. *J. Mol. Biol.* **204**, 109-127.
 7. Buchman, A.R., Lue, N.F., and Kornberg, R.D. (1988) Connections between transcriptional activators, silencers, and telomeres as revealed by functional analysis of a yeast DNA-binding protein. *Mol. Cell. Biol.* **8**, 5086-5099.
 8. Lue, N.F., Buchman, A.R., and Kornberg, R.D. (1989) Activation of yeast RNA polymerase II transcription by a thymidine-rich upstream element in vitro. *Proc. Natl. Acad. Sci. USA* **86**, 486-490.
 9. Lue, N.F., Flanagan, P.M., Sugimoto, K., and Kornberg, R.D. (1989) Initiation by yeast RNA polymerase II at the adenoviral major late promoter in vitro. *Science* **246**, 661-664.
 10. Chasman, D.I., Lue, N.F., Buchman, A.R., LaPointe, J.W., Lorch, Y., and Kornberg, R.D. (1990) A yeast protein that influences the chromatin structure of UASG and functions as a powerful auxiliary gene activator. *Genes & Dev.* **4**, 503-514.
 11. Flanagan, P.M., Kelleher III, R.J., Feaver, W.J., Lue, N.F., LaPointe, J.W., and Kornberg, R.D. (1990) Resolution of factors required for the initiation of transcription by yeast RNA polymerase II. *J. Biol. Chem.* **265**, 11105-11107.
 12. Lue, N.F., and Kornberg, R.D. (1990) Accurately initiated, enhancer-dependent transcription by RNA polymerase I in yeast extracts. *J. Biol. Chem.* **265**, 18091-18094.
 13. Lorch, Y., Lue, N.F., and Kornberg, R.D. (1990) Interchangeable RNA polymerase I and II enhancers. *Proc. Natl. Acad. Sci. USA* **87**, 8202-8206.
 14. Lue, N.F., Flanagan, P.M., Kelleher III, R.J., Edward, A.M., and Kornberg, R.D. (1990) RNA polymerase II transcription in vitro. *Methods in enzymology* **194**, 545-550.
 15. Lue, N.F., and Kornberg, R.D. (1993) A possible role for the yeast TATA-element binding protein in DNA replication. *Proc. Natl. Acad. Sci. USA* **90**, 8018-8022.
 16. Lue, N.F., Sharma, A., Mondragon, A., and Wang, J.C. (1995) A 26K yeast DNA topoisomerase I fragment: crystallographic structure and mechanistic implications. *Structure* **3**, 1315-1322.
 17. Lue, N.F., and Wang, J.C. (1995) ATP-dependent processivity of a telomerase activity from *Saccharomyces cerevisiae*. *J. Biol. Chem.* **270**, 21453-21456.
 18. Nugent, C., Hughes, T.R., Lue, N.F., and Lundblad, V. (1996). Cdc13 is a single-strand telomere binding protein with a dual role in yeast telomere maintenance. *Science* **274**, 249-252. PMID: 8824190.
 19. Lue, N.F., & Peng, Y. (1997). Identification and characterization of a telomerase activity from *Schizosaccharomyces pombe*. *Nucl. Acids Res.* **25**, 4331-4337. PMCID: PMC147048.
 20. Lue, N.F., & Peng, Y. (1998). Negative regulation of yeast telomerase activity through an interaction with an upstream region of the DNA primer. *Nucl. Acids Res.* **26**, 1487-1494. PMCID: PMC147436.
 21. Lue, N.F., and Xia, J. (1998). Species-specific and sequence-specific recognition of the dG-rich strand of telomeres by yeast telomerase. *Nucl. Acids Res.* **26**, 1495-1502. PMCID: PMC147437.
 22. Lue, N.F. (1999). Sequence-specific and conformation-dependent binding of yeast telomerase RNA to single-stranded telomeric DNA. *Nucl. Acids Res.* **27**, 2560-2567. PMCID: PMC148461.
 23. Xia, J., Peng, Y., Mian, I.S., and Lue, N.F. (2000). Identification of functionally important domains in the N-terminal region of telomerase reverse transcriptase. *Mol. Cell. Biol.* **20**, 5196-5207. PMCID: PMC85968.
 24. Niu, H., Xia, J., and Lue, N.F. (2000). Characterization of the interaction between the nuclease and reverse transcriptase activity of the yeast telomerase complex. *Mol. Cell. Biol.* **20**, 6806-6815. PMCID: PMC86210.
 25. Peng, Y., Mian, I.S., and Lue, N.F. (2001). Analysis of determinants of telomerase processivity: similarity to HIV-1 reverse transcriptase and role in telomere maintenance. *Molecular Cell* **7**, 1201-1211. PMID: 11430823.
 26. Bosoy, D., and Lue, N.F. (2001). Functional analysis of conserved residues in the putative "finger" domain of telomerase reverse transcriptase. *J. Biol. Chem.* **276**, 46305-46312. PMID: 11581271.
 27. Hossain, S., Singh, S., and Lue, N.F. (2002). Functional analysis of the C-terminal extension of telomerase reverse transcriptase: a putative thumb domain. *J. Biol. Chem.* **277**, 36174-36180. PMID: 12151386
-

28. Singh, S., Steinberg-Neifach, O., Mian, I.S., and Lue, N.F. (2002) Analysis of *Candida* telomerase: a potential role in telomere end protection. *Eukaryotic Cell* **1**, 967-977. PMID: PMC138754.
 29. Bosoy, D., Peng, Y., Mian, I. S., and Lue, N.F. (2003). Conserved N-terminal motifs of telomerase reverse transcriptase required for ribonucleoprotein assembly in vivo. *J. Biol. Chem.* **278**, 3882-3890. PMID: 12458198.
 30. Lew-Smith, J., Lelivelt, M.J., Enomoto, S., Dahlseid, J.N., Ford, A., McClellan, M., Lue, N.F., Culbertson, M.R., and Berman, J. (2003). The accumulation of mRNAs encoding telomerase components and regulators is controlled by the UPF genes in *Saccharomyces cerevisiae*. *Eukaryotic Cell* **2**, 134-142. PMID: PMC141172.
 31. Singh, S., and Lue, N.F. (2003). Ever Shorter Telomere 1 (EST1)-dependent reverse transcription by *Candida* telomerase *in vitro*: evidence in support of an activating function. *Proc. Natl. Acad. Sci. USA* **100**, 5718-5723. PMID: PMC156267.
 32. Lue, N.F., Lin, Y.-C., and Mian, I.S. (2003). A conserved telomerase motif within the catalytic domain of TERT is specifically required for repeat addition processivity. *Mol. Cell. Biol.* **23**, 8440-8449. PMID: PMC262686.
 33. Bosoy, D., and Lue, N.F. (2004). Yeast telomerase is capable of limited repeat addition processivity. *Nucl. Acids Res.* **32**, 92-101. PMID: PMC373262.
 34. Ciudad, T., Andaluz, E., Steinberg-Neifach, O., Lue, N.F., Gow, N.A.R., Calderone, R.A., and Larriba, G. (2004). Homologous recombination in *Candida albicans*: role of CaRad52p in DNA repair, integration of linear DNA fragments, prevention of chromosome loss and telomere length. *Mol. Microbiol.* **53**, 1177-1194. PMID: 15306020.
 35. Lue, N.F. (2004). Adding to the ends: what makes telomerase processive and how important is it? *BioEssay* **26**, 955-962. PMID: 15351966.
 36. Lue, N.F. and Jiang, S. (2004). Reverse transcriptase at bacterial telomeres. *Proc. Natl. Acad. Sci. USA* **101**, 14307-14308. PMID: PMC521969.
 37. Lue, N.F. (2005). A physical and functional constituent of telomerase anchor site. *J. Biol. Chem.* **280**, 26586-26591. PMID: PMC1237055.
 38. Lue, N.F., Bosoy, D., Moriarty, T., Autexier, C., Altman, B., and Leng, S. (2005). Telomerase can act as a template- and RNA-independent terminal transferase. *Proc. Natl. Acad. Sci. USA* **102**, 9778-9783. PMID: PMC1174988.
 39. Autexier, C., and Lue, N.F. (2006). The structure and function of telomerase reverse transcriptase. *Ann. Rev. Biochem.* **75**, 493-517. PMID: 16756500.
 40. Steinberg-Neifach, O., and Lue, N.F. (2006) Modulation of telomere terminal structure by telomerase components in *Candida albicans*. *Nucl. Acids Res.* **34**, 2710-2722. PMID: PMC1464115.
 41. Hsu, M., McEachern, M., Dandjinou, T.A., Tzfati, Y., Orr, E., Blackburn, E.H., and Lue, N.F. (2007) The *Candida albicans* telomerase core components protects telomeres from aberrant degradation. *Proc. Natl. Acad. Sci. USA*, **104**, 11682-11687. PMID: PMC1913905.
 42. Yu, E.Y., Steinberg-Neifach, O., Dandjinou, T.A., Kang, F., Morrison, A., Shen, X., and Lue, N.F. (2007) Regulation of telomere structure and function by the INO80 chromatin remodeling complex. *Mol. Cell. Biol.*, **27**, 5639-5649. PMID: PMC1952117.
 43. Hsu, M., Yu, E.Y., Singh, S.M., and Lue, N.F. (2007) The mutual dependence of *Candida* Est1p and Est3p in telomerase assembly and activation. *Eukaryotic Cell*, **6**, 1330-1338. PMID: PMC1951134.
 44. Lue, N.F., and Li, Z. (2007). Modeling and structure functional analysis of the putative anchor site of yeast telomerase. *Nucl. Acids Res.*, **35**, 5213-5222. PMID: PMC1976438.
 45. Yu, E.Y., Li, Z., Lei, M., and Lue, N.F. (2008) A proposed OB-fold structure with a protein-interaction surface in the *Candida albicans* telomerase protein Est3. *Nat. Struc. Mol. Biol.* **15**, 985-989. PMID: PMC2656765.
 46. Lue, N.F. (2009) Closing the feedback loop: how cells count telomere bound proteins. *Mol. Cell* **33**, 413-414. PMID: 19250901.
 47. Sun, J., Yu, E.Y., Yang, Y., Confer, L.A., Sun, S.H., Wan, K., Lue, N.F.,* and Lei, M.* (2009) Stn1-Ten1 is an RPA32-RPA14-like complex at telomeres. *Genes & Dev.* **23**, 2900-2914. (*Corresponding authors.) PMID: PMC2800091.
 48. Lue, N.F. (2010) Plasticity of telomere maintenance mechanisms in yeast. *Trends Biochem. Sci.* **35**, 8-17. PMID: PMC2818170.
-

49. Yu, E.Y., Yen, W.-F., Steinberg-Neifach, O., and Lue, N.F. (2010) Rap1 in *Candida albicans*: an unusual structural organization and a critical function in suppressing telomere recombination. *Mol. Cell Biol.* **30**, 1254-1268. PMID: PMC2820896.
 50. Sun, J., Yang, Y., Wan, K., Mao, N., Yu, T.-Y., Lin, Y.-C., DeZwaan, D.C., Freeman, B.C., Lin, J.-J., Lue, N., and Lei, M. (2011) Structural bases of dimerization of yeast telomere protein Cdc13 and its interaction with the catalytic subunit of DNA polymerase α . *Cell Research* **21**, 258-274. PMID: 20877309.
 51. Hsu, M., and Lue, N.F. (2011) Analysis of yeast telomerase by primer extension assays. *Methods Mol. Biol.* **735**, 97-106. PMID: 21461814.
 52. Lue, N.F., and Hsu, M. (2011) A web of interactions at the ends. *Mol. Cell* **42**, 269-271. PMID: 21549304
 53. Chico, L., Ciudad, T., Hsu, M., Lue, N.F., and Larriba, G. (2011) The *Candida albicans* Ku70 modulates telomere length and structure by regulating both telomerase and recombination. *PLoS One* **6**, e23732. doi:10.1371/journal.pone.0023732 PMID: 21886818
 54. Yen, W.-F., Chico, L., Lei, M., and Lue, N.F. (2011) The telomerase regulatory protein Est3 in two *Candida* species physically interacts with both the TEN domain of TERT and telomeric DNA. *Proc. Natl. Acad. Sci. USA*, **108**, 20370-20375. PMID: 21685334.
 55. Belfort, M., Curcio, M.J., and Lue, N.F. (2011) Reverse transcriptase that shaped genomes: retrotransposons and telomerases. *Proc. Natl. Acad. Sci. USA*, **108**, 20304-20310. PMID: 22187457.
 56. Yu, E.Y., Sun, J., Lei, M., and Lue, N.F. (2012) Analyses of *Candida* Cdc13 orthologues revealed a novel OB fold dimer arrangement, dimerization-assisted DNA-binding, and substantial structural differences between Cdc13 and RPA70. *Mol. Cell. Biol.* **32**, 186-198. PMID: 22025677. (*Highlighted by Cover Illustration).
 57. Hsu, M., Yu, E.Y., Sprusanski, O., McEachern, M., and Lue, N.F. (2012) Functional analysis of the single Est1/Ebs1 homologue in *K. lactis* reveals roles in both telomere maintenance and rapamycin resistance. *Eukaryotic Cell*, **11**, 932-942. PMID: 22544908.
 58. Lovejoy, C.A., Li, W., Reisenweber, S., Thongthip, S., Bruno, J., de Lange, T., De, S., Petrini, J.H.J., Sung, P.A., Jasin, M., Rosenbluh, J., Zwang, Y., Weir, B.A., Hatton, C., Ivanova, E., Macconail, L., Hanna, M., Hahn, W.C., Lue, N.F., Reddel, R.R., Jiao, Y., Kinzler, K., Vogelstein, B., Papadopoulos, N., and Meeker, A.K., for the ALT Starr Cancer Consortium (2012) Loss of ATRX, genome instability, and an altered DNA damage response are hallmarks of the alternative lengthening of telomeres pathway. *PLoS Genet*, **8**, e1002772. doi:10.1371/journal.pgen.1002772. PMID: PMC3400581.
 59. Lue, N.F., Zhou, R., Chico, L., Mao, N., Steinberg-Neifach, O., and Ha, T. (2013) The telomere capping complex CST has an unusual stoichiometry, makes multipartite interaction with G-tails and unfolds higher order G-tail structures. *PLoS Genet*, **9**, e1003145. doi:10.1371/journal.pgen.1003145.
 60. Lue, N., Yu, E.Y., and Lei, M. (2013) A popular engagement at the ends. (2013) *Nat. Struct. Mol. Biol.*, **20**, 10-12. PMID: 23288360.
 61. Yu, E.Y., Kojic, M., Holloman, W. K., and Lue, N.F. (2013) Brh2 and Rad51 promote telomere maintenance in *Ustilago maydis*, a new model system of DNA repair proteins at telomeres. *DNA repair*, **12**, 472-479. PMID: 2372622162.
 62. Lue, N.F., and Chan, J. (2013) Duplication and functional specialization of the telomere capping protein Cdc13 in *Candida* species. *J. Biol. Chem.*, **288**, 29115-29123. PMID: 23965999
 63. Wan, B., Yin, J., Horvath, K., Sarkar, J., Chen, Y., Wu, J., Wan, K., Lu, J., Gu, P., Yu, E.Y., Lue, N.F., Chang, S., Liu, Y., and Lei, M. (2013) SLX4 assembles a telomere maintenance toolkit by bridging multiple endonucleases with telomeres. *Cell Report*, **4**, 861-869. PMID: 24012755
 64. Lue, N.F., Chan, J., Wright, W.E., and Hurwitz, J (2014) The Cdc13-Stn1-Ten1 complex stimulates Pol α activity by promoting RNA priming and the primase-to-polymerase switch. *Nat. Comm.* **5**:5762. doi: 10.1038/ncomms6762. PMID: 25503194. PMID: PMC4269169.
 65. de Sena-Tomás*, C., Yu, E.Y.*, Calzada, A., Holloman, W.K., Lue, N.F., and Pérez-Martín, J. (2015) Fungal Ku prevents permanent cell cycle arrest by suppressing DNA damage signaling at telomeres. *Nucl. Acids Res.* **43**, 2138-2151. doi: 10.1093/nar/gkv082. PMID: 25653166.
 66. Steinberg-Neifach, O., Wellington, K., Vazquez, L., and Lue, N.F. (2015) Combinatorial recognition of a complex telomere repeat sequence by the *Candida parapsilosis* Cdc13AB heterodimer. *Nucl. Acids Res.* **43**, 2164-2176. doi: 10.1093/nar/gkv092. PMID: PMC4344524
-

67. Steinberg-Neifach, O., and Lue, N.F. (2015) Telomere DNA recognition in Saccharomycotina fungi: potential lessons for the co-evolution of ssDNA- and dsDNA-binding proteins and their target sites. *Front. Genet.* 6, 162. Doi: 10.3389/fgene.2015.00162. PMID: PMC4416457
68. Yu, E.Y., Pérez-Martín, J., Holloman, W.K., and Lue, N.F. (2015) Mre11 and Blm-dependent formation of ALT-like telomeres in Ku-deficient *Ustilago maydis*. *PLoS Genetics* 11, e1005570. doi: 10.1371/journal.pgen.1005570. PMID: 26492073.
69. Lue, N.F., and Yu, E. (2016) Telomere recombination pathways: tales of several unhappy marriages. *Curr. Gen.* DOI: 10.1007/s00294-016-0653-8. PMID: 27666406
70. Ganduri, S., and Lue, N.F. (2017) STN1-POLA2 interaction provides a basis for primase-Pol α stimulation by human STN1. *Nucl. Acids Res.*, in press.
71. Hsu, M., and Lue, N.F. (2017) *K. lactis* Cdc13-Est1 interaction in telomere maintenance: biochemical reconstitution and functional characterization. *DNA Repair*, submitted.
72. Yu, E.Y., Hsu, M., Holloman, W.K., and Lue, N.F. (2017) Contributions of recombination and repair proteins to telomere maintenance in telomerase-positive and negative *Ustilago maydis*. *Nucl. Acids Res.*, submitted.

Books, book chapters and reviews.

1. Kornberg, R.D., Buchman, A.R., Chasman, D.I., Darst, S.A., Edwards, A.M., Flanagan, P., Kelleher, R., Lorch, Y., Lue, N.F., and Sugimoto, K. (1989) *Developmental Biology*. New York, NY: Wiley-Liss, Inc.
2. Kornberg, R.D., Buchman, R.A., Chasman, D.I., Darst, S.A., Edwards, A.M., Feaver, W.J., Flanagan, P., Kelleher, R.J., Kubalek, E.W., LaPointe, J.W., Lorch, Y., and Lue, N.F. (1990) *Gene Regulation and AIDS*. Houston, Texas: Gulf Publishing Co.
3. Kornberg, R.D., Chasman, D., Darst, S., Edwards, A., Feaver, W., Flanagan, P., Gileadi, O., Henry, L., Kelleher, R., Li, Y., Lorch, Y., Lue, N., Sayre, M., and Tschochner, H. (1992) *Transcriptional Regulation*. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press.
4. Kornberg, R.D., Bushnell, D., Edwards, A.M., Feaver, W.J., Flanagan, P.M., Gileadi, O., Henry, N.L., Kelleher III, R.J., Li, Y., Lorch, Y., Lue, N.F., Sayre, M.H., Svejstrup, J., and Tschochner, H. (1994) *Transcription: Mechanisms and Regulation*. New York, NY: Raven Press, Ltd.
5. Lue, N.F. (2002) *Telomere, Telomerase and Cancer*. Georgetown, Texas: Landes Biosciences.
6. Skordalakes, E., and Lue, N.F. (2012) *TERT structure, function and molecular mechanisms. Telomerases: Chemistry, Biology, and Clinical Applications*. New York, NY: John Wiley and Sons.

D. Research Support. List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and your role (e.g. PI, Co-Investigator, Consultant) in the research project. Do not list award amounts or percent effort in projects.

Ongoing Research Support

1 RO1 GM107287 Lue (PI) 08/11/14--06/30/18

"Telomere G- and C-strand synthesis: mechanisms and regulation"

The goal of this research is to understand the mechanisms of the telomerase, Pol α , and CST complex with respect to the regulation of telomere G and C-strand synthesis.

Agency: National Institute of General Medical Sciences

Role: PI

N/A Lue (co-PI) 09/01/17--08/31/18

"The mechanisms of telomere maintenance in acute myeloid leukemia and therapeutic potential"

The goal of this research is to understand the mechanisms of the telomere maintenance in acute myeloid leukemia and leukemic stem cells, and explore the potential of inhibiting telomere G- and C-strand synthesis.

Agency: Sandra and Edward Meyer Cancer Center

Role: co-PI

Completed Research Support

MCB-1157305 Lue (PI) 05/01/12--04/30/16
"Mechanisms and evolution of the telomere protective complex Cdc13-Stn1-Ten1"
The major goal of this project is to determine the molecular basis of CST complex assembly and its mechanisms of DNA-binding and telomere protection. Another important objective is to examine evolution and functional specialization of Cdc13 paralogs.
Agency: National Science Foundation
Role: PI

Grant No. N/A Lue (PI) 07/01/14--06/30/15
"Understanding recombination-based telomere maintenance in cancer cells by exploiting a unique model system"
The major goal of this project is to identify factors responsible for recombination-based telomere maintenance in cancer cells by using a *U. maydis* mutant that exhibits all the hallmark features of such cancer cells.
Agency: Alice Bohmfalk Charitable Trust
Role: PI

R01 GM062631 Lue (PI) 09/01/07--07/31/2012
"Analysis of Telomerase Reverse Transcriptase"
The major goal of this project is to investigate the mechanisms of telomerase and a telomere-associated chromatin remodeling complex in *Saccharomyces cerevisiae*.
Agency: National Institute of Health
Role: PI

Grant No.: N/A Lue (PI) 04/01/11--03/31/12
"The role of BRCA2 and other recombinational repair protein in telomere maintenance in *Ustilago maydis*"
The major goal of this project is to determine the roles and mechanisms of homology-directed repair (HDR) proteins including BRCA2 in telomere maintenance using *Ustilago maydis* as a model system.
Agency: Weill Cornell Cancer Center
Role: PI

Grant No.: N/A Hahn and de Lange (PI) 07/01/08--06/30/10
"A comprehensive approach to deciphering ALT in human cancers"
The major goal of this project is to investigate the mechanisms of ALT (alternative lengthening of telomeres) in human cancers using a combination of genomic analysis and modeling in a variety of systems including yeast.
Agency: STARR Cancer Consortium
Role: co-PI

R01 GM069507 Lue (PI) 08/01/04--07/31/10
"Telomerase function and regulation in a new model system"
The major goal of this project is to understand the regulatory mechanisms of telomerase accessory proteins and the telomere-protective function of telomerase in *Candida albicans*.
Agency: National Institute of Health
Role: PI

Grant No.: N/A Lue (PI) 01/01/02--12/31/06
"Analysis of the Recruitment of Telomerase to Telomere Ends"
The major goal of this project is to determine the biochemical and structural basis of interaction between telomere-binding proteins and telomerase.
Agency: Irma Hirschl Monique Weill Caulier Trust
Role: PI

R01 GM062631 Lue (PI) 04/01/01--03/31/06
"Analysis of Telomerase Reverse Transcriptase"

The major goal of this project is structure-function analysis of the catalytic subunit of telomerase in *Saccharomyces*.

Agency: National Institute of Health

Role: PI

Grant No.: N/A Lue (PI) 07/01/00--06/30/03

“Analysis of Telomerase components in *Candida albicans*”

The major goal of this project is to analyze the function and mechanisms of putative telomerase proteins in *Candida*.

Agency: Burroughs Wellcome Fund

Role: PI

DAMD 17-99-1-9160 Lue (PI) 05/01/99--04/30/02

“Structural and Functional Analysis of a Telomerase-Associated Nuclease”

The major goal of this project is to determine the identity and function of a nuclease associated with yeast telomerase.

Agency: US Army Breast Cancer Research Program

Role: PI

Grant No.: N/A Lue (PI) 05/01/99--04/30/02

“Purification of the Yeast Telomerase Complex”

The major goal of this project is to purify the native yeast telomerase complex and identify novel constituents of the enzyme.

Agency: AMDcC Foundation

Role: PI

Grant No.: N/A Lue (PI) 01/01/99--12/31/01

“Characterization of the telomerase-telomere complex”

The major goal of this project is to determine the molecular basis of the interaction between yeast telomerase and telomeric DNA.

Agency: American Cancer Society

Role: PI

Grant No.: N/A Lue (PI) 07/01/99--6/30/00

“Telomerase RNA processing and telomerase biogenesis”

The major goal of this project is to determine the mechanisms of telomerase RNA processing and its role in telomerase complex assembly and activity.

Agency: Cohn Foundation for Sarcoma Research

Role: PI

Grant No.: N/A Lue (PI) 06/01/99--5/31/00

“A model system for uncovering telomerase-based anti-cancer agents”

The major goal of this project is to use a heterologous system to screen for telomerase inhibitors.

Agency: Concert for the Cure.

Role: PI

Grant No.: #5-FY96-1169 Lue (PI) 02/01/97--1/31/98

“Characterization of the yeast telomerase complex”

The major goal of this project is to identify components of the yeast telomerase complex and characterize its regulation.

Agency: March of Dimes

Role: PI
