

**Curriculum Vitae**  
**Nelson C. Lau, Ph.D.**  
**Silvio Conte Research Building K-201**  
**Boston University Medical Campus**  
**617-358-4405**  
**nclau@bu.edu**  
**December 30, 2020**

**Academic Training:**

5/1999 B.S. University at Albany SUNY, Albany, NY; Summa Cum Laude, Molecular Biology  
6/2004 Ph.D. Massachusetts Institute of Technology, Cambridge, MA; Biology

**Additional Training:**

7/2004-10/2004 Postdoctoral fellow, Whitehead Institute for Biomedical Research, MA  
11/2004-6/2009 Postdoctoral fellow, Mass. General Hospital and Harvard Medical Center, MA

**Academic Appointments:**

2/2019-present Director, BUSM Genome Science Institute  
1/2019-present Faculty affiliate, Boston University Bioinformatics Program  
7/2017-present Associate Professor, Department of Biochemistry, Boston University School of Medicine  
7/2009-6/2017 Assistant Professor, Department of Biology, Brandeis University

**Hospital Appointments or Other Employment:**

11/2004-6/2009 Postdoctoral fellow, Mass. General Hospital and Harvard Medical Center, MA

**Honors:**

2/2002 Keystone Symposia Scholarship Award  
5/2003 AAAS Newcomb Cleveland Prize  
5/2005 Helen Hay Whitney Foundation Postdoctoral Fellowship  
5/2008 NIH K99 Pathway to Independence Award  
3/2010 Searle Scholar Award

**Licenses and Certification:**

none

**Departmental and University Committees:**

1/2020-present Search Committee for Executive IT Director for BUMC  
9/2018-present Search Committees for Biochemistry/GSI Faculty Recruitment  
9/2018-present Dept of Biochemistry Academic Promotions Committee  
9/2018-present BUSM GMS Academic Appointment  
9/2017-5/2018 BUSM GMS Committee to Discuss Grant Writing Course  
8/2009-6/2015 Brandeis Biology Genetics Training Grant Seminar Class Organizer  
8/2011-6/2017 Brandeis University Undergraduate Advisor  
8/2013-6/2015 Brandeis Biology Graduate Admissions Committee  
8/2015-6/2016 Brandeis Biology Department Senior Research Course Coordinator  
8/2016-6/2017 Brandeis Biology Department Seminar Planning Committee

**Teaching Experience and Responsibilities:**

Fall 2017, -18, -19, -20 FIBS Module 2 Guest Lecture on RNA Biology  
Fall 2018, -19, -20 MD512/OH751 Guest Lecture on DNA Biology  
8/2009-6/2015 BIOL305d Topics Molecular Genetics and Development,  
2/2010, 2/2014 BISC8a Stem Cells Regenerative Medicine  
8/2011-8/2016 BIOL105b Molecular Biology

2/2012, 2/2015                   BIOL124a Epigenetics  
8/2012                               BIOL 175b RiboNucleicAcids

**Major Mentoring Activities:**

7/2011-8/2016    Josef P Clark, PhD, T32 trainee, Thesis: Modulating the transcriptional gene silencing capacity of Piwi/piRNA complexes in Drosophila, now postdoc at University of Wisconsin, Madison.

2018, 2019        Supervisor of PiBS rotation students  
2020                PiBS advisor, Graduate Program in Genetics and Genomics

**Major Administrative Responsibilities:**

2019 to present Director of the Genome Science Institute at Boston University School of Medicine

**Other Professional Activities:**

**Professional Societies: Memberships, Offices, and Committee Assignments:**

2015-present     Member, Genetics Society of America  
2008-present     Member, The RNA Society  
2007-present     Member, American Association for the Advancement of Science

**Editorial Boards:**

2009-present     Manuscript Reviewer for following journals: Nature, Cell, Molecular Cell, Proceedings National Academy of Science, Nature Structure and Molecular Biology, Developmental Cell, Cell Reports, Current Biology, eLife, Genetics, PLoS Biology, PLoS Genetics, Genome Research, Genome Biology, PLoS ONE, Molecular Systems Biology, Molecular Cellular Biology, G3 journal, Nucleic Acids Research, RNA, Genome Biology and Evolution, Nature Communications, Nature Genetics, Nature Ecology & Evolution, Molecular Biology and Evolution, Mobile DNA, Scientific Reports, FasebJ, Open Biology, Journal Molecular Evolution

2014-2015        Guest Editor, PLoS Genetics

**Major Committee Assignments:**

**Federal Government:**

none

**Private/Foundation:**

none

**Study Sections:**

National Institutes of Health:

2010                Ad Hoc Reviewer, Molecular Genetics-C study section

Foundation:

2010                Academica Sinica Program

2012                Human Frontiers Science Program

2010, 2016        The Charles King Trust Fellowship of The Medical Foundation

2015                European Research Council

2016 Deutsche Forschungsgemeinschaft (DFG) German Research Foundation  
2017 NSERC Discovery Grant applications  
2019 National Science Foundation grant reviewer, MCB Genetic Mechanisms Division

**State:**

none

**Other Support:**

**Current:**

8/2020-4/2024 R01GM135215-01A1 PI: Nelson Lau, "THE INTERPLAY BETWEEN TRANSPOSONS AND PIRNA PATHWAYS.", Total Cost: \$ 434,011/yr  
Role: Principal Investigator

4/2016-3/2021 R01AG052465-02 PI: Nelson Lau, "Transposon landscapes and transcriptome diversity in aging neurons", Total Cost: \$ 318,871/yr  
Role: Principal Investigator

**Past:**

4/2017-5/2020 R21HD088792-01 PI: Nelson Lau, "The impact of Piwi associated transcripts in Xenopus germ cell development.", Total Cost: \$220,362/yr (NCE 3/2019-05/2020)  
Role: Principal Investigator

7/2010-6/2013 10-SSP-157 PI: Nelson Lau, "Germline genome regulation by Piwi proteins and small RNAs.", Total Cost: \$330,000  
Role: Principal Investigator

7/2009-6/2012 R00HD057298-03 PI: Nelson Lau, "The impact of Piwi associated transcripts in Xenopus germ cell development.", Total Cost: \$706,052  
Role: Principal Investigator

**Invited Lectures and Conference Presentations:**

**Regional/Local:**

December, 2009 "Piwi-interacting RNAs: dissecting a gonadal transposon regulator in animals", Josephine Bay Paul Center, Marine Biology Lab, MA [*Invited Lecture*]

November, 2010 "Dissecting the Molecular Function of Piwi Proteins and piRNAs", Non-coding RNA Meeting, New York Academy of Science, NY [*Invited Presentation*]

October, 2011 "Transgenic RNAi gene-knockdown in Xenopus with small hairpin RNAs", Xenopus Community Resource Meeting, Marine Biology Lab, MA [*Invited Presentation*]

May, 2012 "Piwi-interacting RNAs (piRNAs) and Small hairpin RNAs (shRNAs), Complexities of gene silencing by small RNAs", RNAi, MicroRNAs, Single Cell Biology Meeting, Waltham, MA [*Invited Presentation*]

October, 2012 "The evolution and regulatory potential of small RNAs in animal germline cells.", UMASS Boston Biology Department, Boston, MA [*Invited Presentation*]

- April, 2013 “Targeting and silencing capacity of Piwi proteins and piRNAs.”, University at Albany Biology Department, Albany, NY [*Invited Presentation*]
- October, 2014 “Transposons and PIWI/piRNA Regulation Impacts LncRNA and Gene Expression Diversity”, Boston Area Gene Expression Meeting, Boston, MA [*Invited Presentation*]
- February, 2015 “Transposon landscape dynamics and the Evolution of Piwi-interacting RNA (piRNA) Clusters.”, Brown University Biology Department, Providence, RI [*Invited Presentation*]
- September, 2015 “Transposons and PIWI/piRNA Regulation Impacts LncRNA and Gene Expression Diversity”, Mobile DNA Meeting, Marine Biology Lab, MA [*Invited Presentation*]
- January, 2016 “Genome and transcriptome regulation by the Piwi/piRNA pathway”, BIDMC Cancer Center/Harvard Medical School, Boston, MA [*Invited Presentation*]
- January, 2016 “Genome and transcriptome regulation by the Piwi/piRNA pathway”, New England Biolabs, Ipswich, MA [*Invited Presentation*]
- March, 2016 “Surfing the waves of transposon and piRNA diversity with genomics and bioinformatics”, Stonehill College Biology Department, North Easton, MA [*Invited Presentation*]
- March, 2016 “Surfing the waves of transposon and piRNA diversity with genomics and bioinformatics”, Boston College Biology Department, Chestnut Hill, MA [*Invited Presentation*]
- September, 2017 “Measuring Transposons Landscape Diversity during *Drosophila* Aging”, Mobile DNA Meeting, Marine Biology Lab, MA [*Invited Presentation*]
- November, 2018 “Can we bioinformatically predict piRNA precursor transcripts?”, BU Systems Biology Seminar Series, BU Bioinformatics Program [*Invited Presentation*]
- August, 2019 “Har-P, a short P-element variant, weaponizes P-transposase to severely impair *Drosophila* development”, Mobile DNA Meeting, Marine Biology Lab, MA [*Invited Presentation*]
- June, 2020 “The short P-element variant, Har-P, collaborates with P transposase to impact *Drosophila* gonad development.”, Boston Area *Drosophila* Meeting, Boston University (Virtual). [*Speaker and Co-Organizer*]

**National:**

- May, 2012 “Evolution and gene silencing capacity of Piwi-interacting RNAs”, 17<sup>th</sup> RNA Society Meeting, University of Michigan, MI [*Conference Presentation*]
- August, 2012 “Mechanisms for PIWI protein interactions with natural and artificial piRNA targets”, CSHL Noncoding RNA meeting, Cold Spring Harbor Labs, NY [*Conference Presentation*]
- July, 2014 “Transposons and PIWI Regulation Impacts LncRNA and Gene Expression Diversity in *Drosophila* Ovarian Cell Cultures”, Chromatin Biology Gordon Research Conference, Waltham, MA [*Invited Presentation*]

- March, 2015 “The evolution of Drosophilid piRNA generating clusters is extremely rapid and variable.”, 56<sup>th</sup> Drosophila Genetics Meeting, Chicago, IL [*Session Chair and speaker*]
- November, 2016 “Nascent RNA elongation factors affects PIWI target silencing of transposon”, CSHL Transposable Elements meeting, Cold Spring Harbor Labs, NY [*Conference Presentation*]
- February, 2018 “Changing Transposon Landscapes in single generations of aging Drosophila genomes”, Keystone Symposium, Santa Fe, NM [*Conference Presentation selected but canceled due to recent death in immediate family*]
- November, 2018 “The short P-element variant, Har-P, collaborates with P transposase to impact Drosophila gonad development.”, CSHL Transposable Elements meeting 2018, Cold Spring Harbor Labs, NY [*Conference Presentation*]
- October, 2020 “Transposon landscape changes in aging Drosophila.”, CSHL Mechanisms of Aging meeting 2020 (Virtual), Cold Spring Harbor Labs, NY [*Conference Presentation*]
- November, 2020 “Integrated small RNA genomics of mosquito cells reveal dynamic evolutionary responses to viruses and transposons.”, CSHL Transposable Elements meeting 2020 (Virtual), Cold Spring Harbor Labs, NY [*Conference Presentation*]

**International:**

- July, 2015 “Transposon landscape dynamics and the Evolution of Piwi-interacting RNA (piRNA) Clusters.”, 15<sup>th</sup> Society Molecular Biology and Evolution Meeting, Vienna, Austria [*Invited Presentation*]
- March, 2016 “Nascent RNA elongation affects PIWI target silencing”, EMBO Meeting Multiple functions of piRNAs and PIWI proteins, Montpellier, France [*Invited Presentation*]
- April, 2016 “Genome and transcriptome regulation by the Piwi/piRNA pathway”, Max Delbruck Center, Berlin, Germany [*Invited Presentation*]
- May, 2017 “Drosophila PAF1 modulates Piwi silencing capacity”, 12<sup>th</sup> IMBA Microsymposium, Vienna, Austria [*Invited Presentation*]

**Bibliography:**

**Original, Peer Reviewed Articles:**

1. Lau NC, Lim LP, Weinstein EG, Bartel DP. An abundant class of tiny RNAs with probable regulatory roles in *Caenorhabditis elegans*. *Science*. 2001 Oct 26;294 (5543):858-62.
2. Landthaler M, Begley U, Lau NC, Shub DA. Two self-splicing group I introns in the ribonucleotide reductase large subunit gene of *Staphylococcus aureus* phage Twort. *Nucleic Acids Res*. 2002 May 1;30(9):1935-43.
3. \*Lim LP, \*Lau NC, \*Weinstein EG, \*Abdelhakim AH, Yekta SO, Rhoades MW, Burge CB, Bartel DP. The MicroRNAs of *Caenorhabditis elegans*. *Genes Dev*. 2003 Apr 15;17(8):991-1008. Epub 2003 Apr 02.
4. Bergman NH, Lau NC, Lehnert V, Westhof E, Bartel DP. The three-dimensional architecture of the class I ligase ribozyme. *RNA*. 2004 Feb;10(2):176-84.

5. Landthaler M, **Lau NC**, Shub DA. Group I intron homing in Bacillus phages SPO1 and SP82: a gene conversion event initiated by a nicking homing endonuclease. *J Bacteriol.* 2004 Jul;186(13):4307-4314.
6. Lim LP, **Lau NC**, Garrett-Engele P, Grimson A, Schelter JM, Castle J, Bartel DP, Linsley PS, Johnson JM. Microarray analysis shows that some microRNAs downregulate large numbers of target mRNAs. *Nature.* 2005 Feb 17;433(7027):769-73. Epub 2005 Jan 30.
7. Abbott AL, Alvarez-Saavedra E, Miska EA, **Lau NC**, Bartel DP, Horvitz HR, Ambros V. The let-7 MicroRNA family members mir-48, mir-84, and mir-241 function together to regulate developmental timing in *Caenorhabditis elegans*. *Dev Cell.* 2005 Sep;9(3):403-14.
8. Li M, Jones-Rhoades MW, **Lau NC**, Bartel DP, Rougvie AE. Regulatory mutations of mir-48, a *C. elegans* let-7 family MicroRNA, cause developmental timing defects. *Dev Cell.* 2005 Sep;9(3):415-22.
9. **\*Lau NC**, **\*Seto AG**, Kim J, Kuramochi-Miyagawa S, Nakano T, Bartel DP, Kingston RE. Characterization of the piRNA complex from rat testes. *Science.* 2006 Jul 21;313(5785):363-7. Epub 2006 Jun 15.
10. Miska EA, Alvarez-Saavedra E, Abbott AL, **Lau NC**, Hellman AB, McGonagle SM, Bartel DP, Ambros VR, Horvitz HR. Most *Caenorhabditis elegans* microRNAs are individually not essential for development or viability. *PLoS Genet.* 2007 Dec;3(12):e215.
11. **Lau NC\***<sup>†</sup>, Robine N\*, Martin R, Chung WJ, Niki Y, Berezikov E, Lai EC. Abundant primary piRNAs, endo-siRNAs and microRNAs in a *Drosophila* ovary cell line. *Genome Research.* 2009. Oct;19(10):1776-85. <sup>†</sup>Co-corresponding Author.
12. **Lau NC**, Ohsumi T, Borowsky ML, Kingston RE, Blower MD. Systematic and single cell analysis of *Xenopus* Piwi-interacting RNAs and Xiwi. *EMBO Journal.* 2009. Oct 7;28(19):2945-58
13. Robine N\*, **Lau NC\***<sup>†</sup>, Balla S\*, Jin Z, Okamura K, Kuramochi-Miyagawa S, Blower MD, Lai EC. A broadly conserved pathway generates 3' UTR-directed primary piRNAs. *Curr Biology.* 2009. Dec 29;19(24):2066-76. <sup>†</sup>Co-corresponding Author.
14. Wu Q, Luo Y, Lu R, **Lau N**, Lai EC, Li WX, Ding SW Virus discovery by deep sequencing and assembly of virus-derived small silencing RNAs. *Proc Natl Acad Sci U S A.* 2010 Jan 26; 107(4):1606-11.\
15. Hall, S.E. <sup>†</sup>, Chirn, G., **Lau, N.C**<sup>†</sup>. and Sengupta, P. RNAi pathways contribute to developmental history-dependent phenotypic plasticity in *C. elegans*. *RNA.* 2013 Mar;19(3):306-19. <sup>†</sup> Co-corresponding Author.
16. Zeng, M., Kuzirian M.S., Harper, L., Paradis, S., and **Lau, N.C.**. Organic small hairpin RNAs (OshR): a Do-It-Yourself platform for transgene-based gene silencing. *Methods.* 2013 Sep 15; 63(2):101-9. PMID:23707624
17. Ghiretti AE, Moore AR, Brenner RG, Chen LF, West AE, **Lau NC**, Van Hooser SD, Paradis S. (2014) Rem2 is an activity-dependent negative regulator of dendritic complexity in vivo. *J Neurosci.* Jan 8;34(2):392-407. PMID: 24403140 PMCID: PMC3870928.
18. Arnold CD, Gerlach D, Spies D, Matts JA, Sytnikova YA, Pagani M, **Lau NC**, Stark A. (2014). Quantitative genome-wide enhancer activity maps in five *Drosophila* species reveal the extent of functional enhancer conservation and turnover during cis-regulatory evolution. *Nature Genetics*, Jul;46(7):685-92. PMID: 24908250 PMCID: PMC425027
19. Sytnikova, Y., Rahman, R., Chirn, G.W., Post, C., Clark, J., and **Lau, N.C.** (2014). Transposable element dynamics and PIWI regulation impacts lncRNA and gene expression diversity in *Drosophila* ovarian cell cultures. *Genome Research.* 2014 Dec;24(12):1977-90. PMID: 25267525. PMCID: PMC4248314
20. Post, C, Clark, J, Sytnikova, Y., Chirn, G.W., and **Lau, N.C.** (2014). The capacity of target silencing by the *Drosophila* Piwi protein and piRNAs. *RNA.* 2014 Dec;20(12):1977-86. PMID: 25336588. PMCID: PMC4238361.
21. Chirn, GW, Rahman, R, Sytnikova, YA, Matts, JA, Zeng, M, Gerlach, D, Yu, M, Berger, B, Kile, BT, and **Lau, NC.** (2015) Conserved piRNA expression from a distinct set of piRNA cluster loci in Eutherian mammals. *Plos Genetics* 11 (11): e1005652. doi:10.1371/journal.pgen.1005652. PMCID: PMC4654475.
22. Rahman, R., Chirn, GW, Kanodia, A, Sytnikova, Y., Brembs, B, Bergman, CM, **Lau, NC.** (2015) Unique transposon landscapes are pervasive across *Drosophila melanogaster* genomes. *Nucleic Acids Research.* Dec 15;43(22):10655-72. doi: 10.1093/nar/gkv1193. PMCID: PMC4678822.
23. Madison-Villar, M., Sun, C., **Lau, NC**, Settles, M., Mueller, RL. Small RNAs from a big genome: the piRNA pathway and transposable elements in the salamander species *Desmognathus fuscus*. (2016). *J Mol Evol.* Oct;83(3-4):126-136. Epub 2016 Oct 14.
24. Toombs, T., Sytnikova, Y., Ang, I., Chirn, GW, **Lau, NC\***, Blower, MD\*. *Xenopus* Piwi proteins interact with a broad proportion of the oocyte transcriptome. *RNA.* (2017) Apr;23(4):504-520. doi: 10.1261/rna.058859.116. Epub 2016 Dec 28. **\*Co-corresponding Author.**

25. Clark, J.P. Rahman, R., Yang, N., Yang, LY, **Lau, NC**. *Drosophila* PAF1 modulates PIWI silencing capacity. *Curr Bio*. (2017) Sep 11;27(1):1-9.
26. Kozeretska IA, Shulha VI, Serga SV, Rozhok AI, Protsenko OV, **Lau NC**. A rapid change in P-element-induced hybrid dysgenesis status in Ukrainian populations of *Drosophila melanogaster*. *Biol Lett*. 2018 Aug;14(8). pii: 20180184. doi: 10.1098/rsbl.2018.0184.
27. Gushchanskaia ES, Esse R, Ma Q, **Lau NC**, Grishok A. (2019) Interplay between small RNA pathways shapes chromatin landscapes in *C. elegans*. *Nucleic Acids Res*. 2019 Jun 20;47(11):5603-5616. 1 PMID: PMC6582410.
28. Zeldich E, Chen CD, Boden E, Howat B, Nasse JS, Zeldich D, Lambert AG, Yuste A, Cherry JD, Mathias RM, Ma Q, **Lau NC**, McKee AC, Hatzipetros T, Abraham CR. (2019) Klotho Is Neuroprotective in the Superoxide Dismutase (SOD1G93A) Mouse Model of ALS. *J Mol Neurosci*. 2019 Oct;69(2):264-285. Epub 2019 Jun 27. PMID: PMC7008951.
29. Srivastav SP, Rahman R, Ma Q, Pierre J, Bandyopadhyay S, **Lau NC** (2019). *Har-P*, a short *P*-element variant, weaponizes *P*-transposase to severely impair *Drosophila* development. *Elife*. 2019 Dec 17;8. pii: e49948. doi: 10.7554/eLife.49948. PMID: PMC6917496
30. Gamez S, Srivastav S, Akbari OS, **Lau NC** (2020). Diverse Defenses: A Perspective Comparing Dipteran Piwi-piRNA Pathways. *Cells*. 2020 Sep 27;9(10):2180. doi: 10.3390/cells9102180. PMID: PMC7601171

### Web Publications and Videos:

1. **Lau, NC**. (2015) TIDAL-Fly: a new database resource of Transposon Landscapes for understanding animal genome dynamics. [http://www.bio.brandeis.edu/laulab/Tidal\\_Fly/Tidal\\_Fly\\_Home.html](http://www.bio.brandeis.edu/laulab/Tidal_Fly/Tidal_Fly_Home.html)
2. **Lau, NC**. (2020) MSRG: Mosquito Small RNA Genomics Database. <https://laulab.bu.edu/msrg/>

### Case Reports, Reviews, Chapters, and Editorials:

#### Proceedings of Meetings and Invited Papers:

1. **Lau NC**, Lai EC. Diverse roles for RNA in gene regulation. *Genome Biol*. 2005;6(4):315. Epub 2005 Mar 29

#### Editorials and Critical Reviews:

1. **Lau NC**, Bartel DP. Censors of the Genome. *Scientific American*. 2003 Aug;289(2):34-42.
2. \*Seto AG, Kingston RE, \***Lau NC**. The coming of age for Piwi proteins. *Mol Cell*. 2007 Jun 8;26(5):603-9.
3. **Lau NC**. Small RNAs in the animal gonad: Guarding genomes and guiding development. *Int J Biochem Cell Biol*. 2010. Aug;42(8):1334-47. Epub 2010 Mar 19.
4. Sytnikova, Y, and **Lau, N.C**. Does the APC/C mark MIWI and piRNAs for a final farewell? *Developmental Cell*. 2013. Jan 28;24(2):119-20

#### Book Chapters:

1. **Lau NC**. Analysis of small endogenous RNAs. *Curr Protoc Mol Biol*. 2008 Jan;Chapter 26:Unit26.7.
2. Matts, J.A., Sytnikova, Y., Chirn, G., Igloi, G.L., and **Lau, N.C**. (2014). Small RNA library construction from minute biological samples. *Methods Mol Biol*. Ed. M. Siomi. 1093: 123-136. PMID: 24178561 PMID: PMC4036803
3. Ow MC, **Lau NC**, Hall SE. (2014) Small RNA library cloning procedure for deep sequencing of specific endogenous siRNA classes in *Caenorhabditis elegans*. *Methods Mol Biol*. 1173:59-70. PMID: 24920360
4. Clark, J., and **Lau, N.C**. (2014) Piwi proteins and piRNAs step onto the systems biology stage. *Adv Exp Med Biol*. 825:159-97. doi: 10.1007/978-1-4939-1221-6\_5. PMID: 25201106. PMID: PMC4248790

#### Patents:

1. **Lau, Nelson**, United States Patent Application Serial No. 14/892,629, Filed: November 20, 2015  
Title: ORGANIC SMALL HAIRPIN RNAS
2. **Lau, Nelson**, Provisional Patent Application EFS ID: 23948661., Filed: October 20, 2016  
Title: Modified Cas9 Compositions and Methods of Use