CURRICULUM VITAE

Date: April 12, 2024

NAME: Eda Yildirim

PRESENT POSITION (TITLE) AND EMPLOYER'S PHYSICAL ADDRESS:

Dates of Employment: 08/01/2014- Present

Position:

Assistant Professor of Cell Biology (Tenure-track)
Department of Cell Biology
Duke University School of Medicine, DUMC Box 3709, Durham, NC 27710

EDUCATION:

B.S. 1993-1997
Middle East Technical University
Department of Biology, Ankara, Turkey

Ph.D. 1998-2005
University of California, Los Angeles (UCLA)
Department of Molecular, Cell, and Developmental Biology, Los Angeles, CA
Ph.D. Thesis: Molecular cloning, cell differentiation and pathophysiological studies of calcium signaling molecules, canonical transient receptor potential (TRPC) channels and inositol (1,4,5)-trisphosphate receptors (IP_3Rs)
Advisor: Lutz Birnbaumer, Ph.D.

PROFESSIONAL TRAINING AND ACADEMIC CAREER:

Institution	**Position/Title**	**Dates**
National Institute of Health, National Institute of Environmental Health Sciences (NIH/NIEHS) Laboratory of Signal Transduction *Mentor:* Lutz Birnbaumer, Ph.D.	Visiting Fellow	2005-2006
Howard Hughes Medical Institute Massachusetts General Hospital Harvard Medical School Department of Molecular Biology Department of Genetics *Mentor:* Jeannie T. Lee, M.D./Ph.D.	Postdoctoral Fellow	2006-2014
Duke University Medical School Department of Cell Biology	Assistant Professor (Tenure-track)	2014-Present
Duke University Graduate Programs in: Cell and Molecular Biology	Training Faculty	2014-Present
Developmental and Stem Cell Biology	Training Faculty	2014-Present
University Program in Genetics and Genomics (UPGG)	Training Faculty	2014-Present
Duke Cancer Institute	Member	2014-Present

Duke Center for RNA Biology	Member	2014-Present
Duke Regeneration Center	Member	2017-Present
North Carolina Central University	Adjunct Graduate Faculty	2020-Present

AREAS OF RESEARCH INTERESTS:

1. To define chromatin-associated function of the nuclear pore complex proteins, nucleoporins, in cell type-specific gene and chromatin regulatory mechanisms and determine the significance of these mechanisms in genome function during development and diseases such as blood cancer.

2. To define cell-type specific mechanisms of X-chromosome inactivation (XCI) and determine the functional relationship between XCI and cancer including blood cancers and X-linked diseases.

CURRENT GRANT SUPPORT:

R01 GM149578-01 **National Institutes of Health/NIGMS**
Title: Mechanisms of chromatin structure and transcription regulation by the nuclear pore complex
Purpose: To define determinants and mechanisms of NPC-mediated gene regulation, chromatin structure, and spatial chromatin organization, and to elucidate the functional relevance of these mechanisms during early development.
PI: Eda Yildirim, Ph.D., 6 calendar months
Total costs: $2,173,084 for time period (05/05/2023-03/31/2028)

1(GG14746-47) **National Institutes of Health/NIAID, Columbia University**
Title: Mechanisms of myeloid cells dysregulation in radiation survivors
Purpose: To determine how epigenetic changes induced by the acute genotoxic stress are causal to alterations in monocytes-derived macrophages differentiation programs and influence inflammatory disorders occurring in radiation survivors.
PI: Luigi Racioppi, M.D./Ph.D.
Collaborator: Eda Yildirim, Ph.D., 0.6 calendar months
Total costs: $322,000 for time period (09/06/2023-09/05/2024)

ORGANIZATIONS AND PARTICIPATION:

Grant Reviewing:

2016	University of North Dakota, CoBRE Pilot Grants, grant reviewer
2018	NIH panel grant reviewer (*Ad hoc*), NCSD (Nuclear & Cytoplasmic Structure/Function and Dynamics) Study Section
2018-Present	Irish Research Council evaluator for the Postgraduate Scholarship Program
2021-Present	NSF grant reviewer, Genetic Mechanisms
2021-Present	European Research Council (ERC) grant reviewer
2023-Present	Israel Science Foundation (ISF) grant reviewer

Peer Reviewing/ Publishing:

2013-Present	Peer Reviewer: Cell Reports, Chromosoma, Chromosome Research, Developmental Biology, Elife, Frontiers in Cell and Developmental Biology, Genome Biology, Genome Research, Molecular Genetics and Genomics, Nature Communications, Nature Structural and Molecular Biology, PLOS Genetics, PLOS ONE, Proceedings for National Academy of Sciences, RNA Biology
2018-Present	Member, Editorial Advisory Board, Chromosome Research
2018-Present	Review Editor, Frontiers in Cell, and Developmental Biology
2021-Present	Topic Editor, Cells
2022-Present	Guest Editor (with Dr. Maya Capelson), Current Opinion in Genetics & Development, Section in Genome Architecture and Expression (2024)

Scientific Meeting Chairing:

2019	Co-organizer (with Drs. Eric Schirmer, Mark Field), 13th International Conference on Nucleocytoplasmic Transport, Edinburgh, UK
2020	Co-organizer (with Drs. Katharine Ullman, Jan Lammerding, Lori Wallrath), Special Interest Subgroup on "The nuclear envelope and nucleoporins: Influencers of cellular structure and the genome" American Society for Cell Biology (ASCB) Cell Bio Symposium 2020
2021	Co-organizer (with Drs. Satoshi Namekawa, Bernhard Payer, Kristina Godek and Eduardo Torres), Special Interest Subgroup on "Chromosome dynamics and aneuploidy in development" American Society for Cell Biology (ASCB) Cell Bio Symposium 2021
2023	Co-organizer (with Drs. Mary Dasso, Andre Hoelz, Jason Brickner, Yi Ren), Virtual seminar series on "Nuclear Pore Complex, Nuclear Envelope and Nuclear Transport 2023-24"

Other:

2017	Session Chair, Session on 'Epigenetic regulation', NIEHS Symposium on Epigenetics, Stem Cells, and Environmental Sciences
2018	Poster Judge, Duke School of Medicine Research Week
2019	Poster Judge, 2019 Symposium on RNA Biology XIII: RNA Tool and Target
2020	Poster Judge, Society of Developmental Biology Virtual Southeast Regional Meeting
2020	Poster Judge, Duke School of Medicine Research Week
2020-Present	Adjunct Graduate Faculty, North Carolina Central University. I am serving as a member of the thesis committee of graduate student Amr Waly at the Jodie Fleming Lab.
2021	Session Chair, Session on 'Chromosomes and Nuclear organization', Asilomar Chromatin, Chromosomes, and Epigenetics Conference

SCHOLARLY SOCIETIES:

2020-2021	Member, American Association for Cancer Research
2020-2021	Member, Society of Developmental Biology
2014-Present	Member, American Society for Cell Biology

PROFESSIONAL AWARDS AND SPECIAL RECOGNITIONS:

1997	Graduated with Honors, B.Sc., METU, Ankara, Turkey
1998-2004	Ph.D. Fellowship, The Higher Education Council of Turkey
2006	Fellows Award for Research Excellence, National Institutes of Health (NIH)
2008-2009	ECOR Medical Discovery Fund Postdoctoral Fellow Award, Massachusetts General Hospital (MGH)
2014-2019	Whitehead Scholars Award, Duke University School of Medicine
2015-2016	Leukemia Research Foundation, The Hollis Brownstein Research Award
2016	Selected to represent Duke University for Pew-Stewart Scholars for Cancer Research Award
2018-Present	Kavli Frontiers of Science Fellow, National Academy of Sciences
2018-Present	Director, Duke Epigenetics and Epigenomics Program

PUBLICATIONS: (*corresponding author)

1. **Yildirim E**., Dietrich, A., and Birnbaumer, L. (2003). The mouse C-type transient receptor potential 2 (TRPC2) channel: Alternative splicing and calmodulin binding to its N terminus. ***Proc Natl Acad Sci USA.*** 100, 2220-2225. DOI: 10.1073/pnas.0438036100. Epub 2003 Feb 24. PMID: 12601176; PMCID: PMC151321.

2. Birnbaumer, L., **Yildirim, E.**, and Abramowitz, J. (2003). A comparison of the genes coding for canonical TRP channels and their M, V, and P relatives. ***Cell Calcium***. Special Issue: TRP channels: facts, fictions, challenges. 33 (5-6), 419-432. DOI: 10.1016/s0143-4160(03)00068-x. PMID: 12765687.

3. **Yildirim, E.**, Kawasaki, B.T., and Birnbaumer, L. (2005). Molecular cloning of TRPC3a, an N-terminally extended, store-operated variant of the human C3 transient receptor potential channel. ***Proc Natl Acad Sci USA***. 102, 3307-3311. DOI: 10.1073/pnas.0409908102. Epub 2005 Feb 22. PMID: 15728370; PMCID: PMC552946.

4. Dietrich, A., Menderos y Schnitzer M., Gollasch, M, Gross, V., Storch, U., Dubrovska, G., Obst, M., **Yildirim, E**., Salanova, B., Kalwa, H., Essin, K., Pinkenburg, O., Luft, F.C., Gudermann, T., and Birnbaumer, L. (2005). Increased vascular smooth muscle contractility in TRPC6-/- mice. ***Mol Cell Bio.*** 25, 6980-6989. DOI: 10.1128/MCB.25.16.6980-6989.2005. PMID: 16055711; PMCID: PMC1190236.

5. Birnbaumer, L., **Yildirim, E**., Liao, Y., and Abramowitz, J. (2006). Molecular and functional diversity of the TRP family of ion channels. TRPC channels and their role in ROCE/SOCE. In "***Insights into receptor function and new drug development targets***", 5th IPSEN Colloquium in Medicine and Research Endocrinology. pp1- 22. (Conn, P.M., Kordon, C., and Christen, Y., eds.). Sringer-Verlag Press, Heidelberg. https://doi.org/10.1007/3-540-34447-0_1

6. Abramowitz, J., **Yildirim, E**., and Birnbaumer, L. (2006). The TRPC Family of Ion Channels: relation to the TRP superfamily and role in Receptor- and Store-operated Calcium Entry. In "***The TRP Family of Ion Channels***". (Liedke, W., ed). CRC Press. PMID: 21204485.

7. Liao, Y., Erxleben, C., **Yildirim, E.**, Abramowitz, J., Armstrong, J.L., and Birnbaumer, L. (2007). Orai proteins interact with TRPC channels and confer responsiveness to store depletion. ***Proc Natl Acad Sci USA.*** 104, 4682-4687. DOI: 10.1073/pnas.0611692104. Epub 2007 Mar 7. PMID: 17360584; PMCID: PMC1838661.

8. Liu, X., Cheng, K.T., Bandyopadhyay, B.C., Pani, B., Dietrich, A., Paria, B.C., Swaim, W.D., Beech, D., **Yildirim E.**, Singh, B.B., Birnbaumer, L., and Ambudkar, I. (2007). Attenuation of store-operated Ca2+ current impairs salivary gland fluid secretion in TRPC1(-/-) mice. ***Proc Natl Acad Sci USA.*** 104, 17543-17547. DOI: 10.1073/pnas.0701254104. Epub 2007 Oct 23. PMID: 17956991; PMCID: PMC2077292.

9. **Yildirim, E**., and Birnbaumer, L. (2007). TRPC2: molecular biology and functional importance. In "***Handbook of Experimental Pharmacology***". (Flockerzi, V., ed), (179): pp53-75. Springer-Verlag Heidelberg Press. DOI:10.1007/978-3-540-34891-7_3. PMID: 17217050.

10. **Yildirim, E.**[#], Carey, M.A.[#], Card, J.W., Dietrich, A., Flake, G.P., Zhang, Y., Bradbury, J.A., Rebolloso, Y., Germolec, D.R., Morgan, D.L., Zeldin, D.C., and Birnbaumer, L. (2012). Severely blunted allergen-induced pulmonary Th2-cell response and lung hyperresponsiveness in Type 1 transient receptor potential channel (TRPC1)-deficient mice. ***Am J Physiol Lung Cell Mol Physiol.*** 303 (6), 539-49. DOI: 10.1152/ajplung.00389.2011. Epub 2012 Jul 13. PMID: 22797250; PMCID: PMC3468476. [#]Equal contribution.

11. **Yildirim, E.**[#], Sadreyev, R.I.[#], Pinter, S.F., and Lee, J.T. (2012). X-chromosome hyperactivation in mammals via nonlinear relationships between chromatin states and transcription. ***Nat Struct Mol Bio****.* 19(1), 56-61. DOI: 10.1038/nsmb.2195. PMID: 22139016; PMCID: PMC3732781. [#]Equal contribution.

12. Pinter, S.F., Sadreyev, R.I., **Yildirim, E.**, Jeon, Y., Ohsumi, T., Borowsky, M., and Lee, J.T. (2012). Spreading of X chromosome inactivation via a hierarchy of defined Polycomb stations. ***Genome Res.*** 10, 1864-76. DOI: 10.1101/gr.133751.111. Epub 2012 Sep 4. PMID: 22948768; PMCID: PMC3460182.

13. Sadreyev, R.I., **Yildirim, E.**, Pinter, S.F., and Lee, J.T. (2013). Bimodial quantitative relationships between histone modifications for X-linked and autosomal loci. ***Proc Natl Acad Sci USA*****.** 110, 6949-6954. DOI: 10.1073/pnas.1216449110. Epub 2013 Apr 5. PMID: 23564346; PMCID: PMC3637770.

14. **Yildirim, E.**, Kirby, J.E., Brown, D.E., Mercier, F.E., Sadreyev, R.I., Scadden, D.T., and Lee, J.T. (2013). Xist RNA is a potent suppressor of hematologic cancer in mice. ***Cell***. 152, 727-742. DOI: 10.1016/j.cell.2013.01.034. PMID: 23415223; PMCID: PMC3875356.

15. Pinter, S.F., Colognori, D., Beliveau, B.J., Sadreyev, R.I., Payer, B., **Yildirim, E.,** Wu, C.T., and Lee J.T. (2015). Allelic imbalance is a prevalent and tissue-specific feature of the mouse transcriptome. ***Genetics.*** 200, 537-549. DOI: 10.1534/genetics.115.176263. Epub 2015 Apr 9. PMID: 25858912; PMCID: PMC4492378.

16. O'Connell, K.E., Mikkola, A.M., Stepanek, A.M., Vernet, A., Hall, C.D., Sun, C.C., **Yildirim, E.,** Staropoli J.F., Lee, J.T., Brown, D.E. (2015). Practical murine hematopathology: a comparative review and implications for research. ***Comp Med.*** 65, 96-113. PMID: 25926395; PMCID: PMC4408895.

17. Savol, A.J., Wang, P.I., Jeon, Y., Colognori, D., **Yildirim, E.**, Pinter, S.F., Payer, B., Lee, J.T. and Sadreyev, R.I. (2017). Genome-wide identification of autosomal genes with allelic imbalance of chromatin state. ***PLoS One.*** 12(8):e0182568. DOI: 10.1371/journal.pone.0182568. eCollection 2017. PMID: 28796844; PMCID: PMC5552117.

18. Yang, T., and **Yildirim, E.*** (2017). Epigenetic and LncRNA-Mediated Regulation of X Chromosome Inactivation and Its Impact on Pathogenesis. ***Curr Pathobiol Rep*****.** DOI:10.1007/s40139-017-0120-3.

19. Yang, T., Shi, Y., and **Yildirim, E.*** (2017). Implications of Long Noncoding RNAs in Cancer Epigenetics. In "Cancer and Noncoding RNAs". Translational Epigenetics Series. 1, Chapter 21: pp381-406. (Chakrabarti, J. and Sanga, M., eds), Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-811022-5.00021-8.

20. Sun, J, Shi, Y., and **Yildirim, E.*** (2019). The Nuclear Pore Complex in Cell Type-Specific Chromatin Structure and Gene regulation. ***Trends Genet.*** 35(8): 579-588. PMID: 31213386.

21. Yang, L., **Yildirim, E.** Kirby, J.E., Press, W., and Lee, J.T. (2020). Widespread organ tolerance to Xist loss and X reactivation except under chronic stress in the gut. ***Proc Natl Acad Sci USA*****.**117 (8): 4262-4272. PMID: 32041873; PMCID: PMC7049159.

22. Kadota, S., Ou, J., Shi, Y., Lee, J.T., Sun, J., and **Yildirim, E.*** (2020). Nucleoporin 153 links nuclear pore complex to chromatin architecture by mediating CTCF and cohesin binding. ***Nat***

Commun. 11, 2606. DOI: 10.1038/s41467-020-16394-3. PMID: 32451376; PMCID: PMC7248104.

23. Cao, J., Verma, S.K., Jaworski, E., Mohan, S., Negasawa, C.K., Rayavara, K., Sooter, A., Miller, S.N., Holcomb, R.J., Powell, M.J., Ji, P., Elrod, D.N., **Yildirim, E.**, Wagner, E.J., Popoov, V., Garg, N.J., Routh, A.L., and Kuyumcu-Martinez, M.N. (2021). RBFOX2 is critical for maintaining alternative polyadenylation patterns and mitochondrial health in rat myoblasts. ***Cell Reports.*** DOI: 10.1016/j.celrep.2021.109910. PMID: 34731606; PMCID: PMC8600936.

24. Yang, T., Ou, J., and **Yildirim, E**.* (2022). Xist exerts gene-specific silencing during XCI maintenance and impacts lineage-specific cell differentiation and proliferation during hematopoiesis. ***Nat Comm.*** 13, 4464. PMID: 35915095; PMCID: PMC9343370.

25. Bryson, V., Wang, C., Zhou, Z., Singh, K., Volin, N., **Yildirim, E.**, Rosenberg, P. (2024). The D84G mutation in STIM1 causes nuclear envelope dysfunction and myopathy in mice. ***Journal of Clinical Investigation.*** DOI: 10.1101/2023.05.03.539279. PMID: 37205564; PMCID: PMC10187192.

INVITED LECTURES AND PRESENTATIONS:

2014 Invited Speaker, University of Texas Southwestern Medical Center, Green Center, Dallas TX, January 2014
2014 Invited Speaker, Duke University, Department of Cell Biology Durham NC, February 2014
2014 Invited Speaker, Duke University, Department of Pharmacology & Cancer Biology, Durham NC, February 2014
2014 Invited Speaker, Wistar Institute, Philadelphia PA, February 2014
2014 Invited Speaker, Duke University, UPGG, Durham NC, September 2014
2014 Invited Speaker, University of California, Department of Developmental & Cell Biology, Irvine CA, December 2014
2015 Invited Speaker, NIEHS, Epigenetics & Stem Cell Biology Group, Durham NC, March 2015
2015 Invited Speaker, Duke University, Center for RNA Biology, Durham NC, May 2015
2015 Invited Speaker, Abcam Meeting on Epigenetics in Development, Aging and Disease, Chapel Hill NC, September 2015
2017 Invited Speaker, RNA Symposium, RNA Institute, Albany NY, March 2017
2017 Invited Speaker, 12th International Conference on Nuclear Export, Girona Spain, October 2017
2017 Invited Speaker, Asilomar Chromatin & Epigenetics Conference, Monterey CA, December 2017
2018 Invited Speaker, Kavli Frontiers of Science Symposium, National Academy of Sciences, Irvine CA, February 2018
2018 Invited Speaker, RNA Symposium, RNA Institute, Albany NY, February 2018
2018 Invited Speaker, National Institute of Environmental Health Sciences, Pathology Group, Durham NC, May 2018
2018 Invited Speaker, University of Texas Medical Branch, Biochemistry Department, Galveston TX, November 2018
2018 Talk, Asilomar Chromatin & Epigenetics Conference, Monterey CA, December 2018
2019 Poster, Gordon Research Conference, Epigenetics, Holderness, NH, July 2019
2019 Invited Speaker, 13th Nuclear Transport Symposium, Edinburgh, UK, August 2019
2019 Invited Speaker, RNA Society Symposium, Durham, NC October 2019
2019 Invited Speaker, Duke University RNA Club, NC October 2019
2019 Invited Speaker, University of Texas, Department of Molecular Biosciences, Austin, TX

November 2019

2019 Invited Speaker, Sabanci University, Molecular Biology, Genetics and Bioengineering Program, Istanbul, Turkey, December 2019

2020 Invited Speaker, American Society for Cell Biology (ASCB), Virtual, November 2020

2021 Invited Speaker, Duke DSCB Colloquium Seminar Series, Virtual, March 2021

2021 Talk, Asilomar Chromatin & Epigenetics Conference, Virtual, December 2021

2022 Invited Keynote Speaker, The Society of Toxicologic Pathology (STP) Annual Symposium 2022, Austin TX, June 2022

2022 Invited Speaker, 14th International Conference on Nucleocytoplasmic Transport, Quebec, Canada, September 2022

2022 Invited Speaker, University of Texas Medical Branch, Biochemistry Department, Galveston, TX November 2022

2022 Invited Speaker, MIT, 2nd Sex Differences in the Immune System, Virtual, December 2022

2022 Invited Speaker, American Society for Cell Biology (ASCB), Washington DC, December 2022

2023 Invited Speaker, Keystone Symposia, Chromatin Architecture in Development and Human Health, British Columbia, Canada, March 2023

2023 Poster, Gordon Research Conference, Epigenetics, Holderness, NH August 2023

2023 Invited Speaker, Bioinfocongress V, Virtual, Istanbul, Turkey, October 2023

2023 Invited Lecturer, Department of Molecular Biology and Genetics, Koc University, Istanbul Turkey November 2023

2023 Invited Lecturer, Department of Molecular Biology and Genetics, Bogazici University, Istanbul Turkey November 2023

2024 Invited Speaker, Department of Molecular Cell and Developmental Biology, University of Dundee, Scotland, Virtual, January 2024

2024 Invited Speaker, Brown Cancer Center, RI, January 2024

2024 Poster, Keystone Symposia, Epigenetic Mechanisms and Cancer Treatment, Santa Fe, NM, February 2024

2024 Invited Speaker, Centre of Excellence for Embryology & Healthy Development, University of Oslo, Norway, April 2024

2024 Invited Speaker, Department of Molecular Biology and Biochemistry, Michigan State University, East Lansing, MI, April 2024

TEACHING RESPONSIBILITIES INCLUDING CONTINUING EDUCATION:

08-12, 1997	BIOL251 *Cell Biology Laboratory*, Middle East Technical University, Turkey. Teaching Assistant. (6 lab lectures)
01-07, 1998	BIOL307 *Biochemistry I*, Middle East Technical University METU, Turkey. Teaching Assistant. (6 lab lectures)
03-06, 2000	LS3 *Life Sciences 3*, UCLA, CA. Teaching Assistant. (8 lab lectures)
03-06, 2001	MCDBIO144 *Advance Molecular Biology*, UCLA, CA. Teaching Assistant. (8 lab lectures)
01, 2015	MCB/CBI 208 *Stem Cell Biology*, Duke University, NC. Section on hematopoietic stem cells. (2 lectures)
10, 2015	CMB 551, Duke University, NC. Section on nuclear structure/gene regulation. (6 lectures)
04, 2016	MCB/CBI 208 *Stem Cell Biology*, Duke University, NC. Section on hematopoietic stem cells. (2 lectures)
11, 2016	CMB 551, Duke University, NC. Section on nuclear structure/gene regulation. (6 lectures)
11, 2017	CMB 551, Duke University, NC. Section on nuclear structure/gene regulation. (6

	lectures)
11, 2018	CMB 710, Duke University, NC. Section on nuclear structure/gene regulation. (6 lectures)
11, 2018	BIOTRAIN 720, Duke University, NC. Grant writing. (2 lectures)
11, 2020	BIOTRAIN 720, Duke University, NC. Grant writing. (2 lectures)

PARTICIPATION IN ACADEMIC AND ADMINISTRATIVE ACTIVITIES OF DUKE UNIVERSITY AND DUKE MEDICAL CENTER:

2014-Present	Member, Duke University Program in Cell and Molecular Biology (CMB)
2014-Present	Member, Duke University Program in Development & Stem Cell Biology (DSCB)
2014-Present	Member, Duke University Program in Genetics & Genomics (UPGG)
2014-Present	Member, Duke Center for RNA Biology
2014-Present	Member, Duke Cancer Institute
2014-Present	Chair/Member, PhD Thesis Committee, *14 Graduate Students* (Nguyen Huynh, Ceri Weber, Delisa E. Clay, Jason Long, Anzhi Chen, Rebecca Moreci, Sara Payne, Hongyuan Zhang, Jennifer Kwon, Fei Sun, Tianqi Yang, Jiayu Sun, Shannon Dupont, Taylor Chavez)
2015-Present	Advisor, *12 Rotation Students* (Emily Bowie, Erez Cohen, Rachel Hoffman, Valerie Garner, Jordan Powers, Lauren Tracy, Min Jin Lee, Xiaohui (Hazel) Ang, Martine Tremblay, Tianqi Yang, Jiayu Sun, Mackenzie Parmenter)
2015-2022	Member, Duke University UPGG Graduate Student Admissions Committee
2015-2018	Co-director, Duke Epigenetics and Epigenomics Program
2015-2018	Organizer, Duke Epigenetics and Epigenomics Program Seminar Series
2015-Present	Advisor, Undergraduate summer internships (Eda Erata, Minel Arinel)
2015-2019	Member, Duke University Basic Sciences Faculty Steering Committee
2016	Co-Director, Duke RCR Ethics Course
2016-Present	Advisor, Undergraduate Research Assistants, *10 Students* (Kevin Murgas, Yuming Shi, Inessa Chandra, Vanessa Tam, Amy Zhao, Semin Kim, Soomin Myoung, Kyra Chen, Maria Hromcenco, Harsha Rajkumar)
2016-Present	Advisor, Undergraduate student Thesis, *5 Students* (Kevin Murgas, Yuming Shi, Inessa Chandra, Amy Zhao, Semin Kim)
2016-2017	Member, Faculty advising committee of the incoming CMB graduate students
2016-2017	Member, Faculty search committee, Department of Cell Biology
2017-Present	Member, CMB Thursday Seminar Series Organizing Committee
2017-Present	Member, Duke Regeneration Center
2017	Director, Duke RCR Ethics Course
2018-Present	Director, Duke Epigenetics and Epigenomics Program
2018-Present	Member, Duke DSCB Colloquium Organizing Committee
2022-Present	Member, Duke UPGG Seminar Series Organizing Committee

GRADUATE STUDENT DISSERTATION COMMITTEE SERVICE:

Duke University, Durham, NC

- Member, Nguyen Huynh, Guilak Lab, Department of Biomedical Engineering (graduated)
- Member, Jennifer Kwon, Gersbach Lab, Department of Biomedical Engineering (graduated)
- Chair, Ceri Weber, Capel Lab, Department of Cell Biology (graduated)
- Chair, Delisa E. Clay, Fox Lab, Department of Cell Biology (graduated)
- Chair, Jason Long, Hilton Lab, Department of Cell Biology (graduated)

- Chair, Anzhi Chen, Poss Lab, Department of Cell Biology (graduated)
- Chair, Rebecca Moreci, Lechler Lab, Department of Cell Biology (graduated)
- Chair, Sara Payne, Sherwood Lab, Department of Biology (graduated)
- Chair, Fei Sun, Poss Lab, Department of Cell Biology (graduated)
- Chair, Hongyuan Zhang, Alman Lab, Department of Orthopedic Surgery (graduated)
- Advisor, Jiayu Sun, Yildirim Lab, Department of Cell Biology (graduated with MA)
- Advisor, Tianqi Yang, Yildirim Lab, Departments of Cell Biology and Pharmacology (graduated)
- Chair, Shannon Dupont, Capel Lab, Department of Cell Biology (in training)
- Member, Taylor Chavez, Gerecht Lab, Department of Biomedical Engineering (in training)

North Carolina Central University, Durham, NC

- Member, Amr Waly, Fleming Lab, Department of Biological & Biomedical Sciences (in training)

Oslo University Hospital Rikshospitalet, Oslo, Norway

- Member, Ida Monshaugens, Ougland Lab, Department of Microbiology (graduated)

PERSONNEL TRAINED/UNDER TRAINING IN THE YILDIRIM LAB AT DUKE UNIVERSITY:

Current lab members:

Postdoctoral Fellows: Shinichi Kadota, Ph.D. (since 2015)

Graduate Students: Mackenzie Parmenter (DSCB Program; 2023 Fall Rotation)

Undergraduate Research Assistants: Kyra Chen (since Jan 2023), Maria Hromcenco and Harsha Rajkumar (since Sept 2023)

Past lab members:

Postdoctoral Fellows: Boram Kim, Ph.D. (2017), Tianqi Yang, Ph.D. (2022 July-Sept)

Graduate Students (positions after graduation):

- Tianqi Yang, Ph.D. in Pharmacology 2022 (Postdoc at Yale University, Siyuan Wang lab, 2022 Sept-Present)
- Jiayu Sun, MA in Cell Biology 2019 (PhD student in Biostatistics Program at University of Washington St. Louis, 2020-Present)

Undergraduate / High School Student Volunteers (positions after leaving the lab):

- Amy Zhao (Medical Student, University of Michigan School of Medicine, Michigan)
- Vanessa Tam (Masters Student, Biomedical Engineering, Duke University, North Carolina)
- Inessa Chandra (Graduate Student, University of Southern California, Marine Environmental Biology Program, California)
- Yuming Shi (Medical Student, Case Western Medical School, Ohio)
- Kevin Murgas (MD/PhD Student, Stony Brook School of Medicine, New York)
- Minel Arinel (Graduate Student, Duke University, Neurobiology Program, North Carolina)
- Soomin Myoung (Associate in Research, Duke University Biomedical Engineering, North Carolina)
- Eda Erata, Ph.D. (Scientist I, Ultragenyx Pharmaceutical Inc., Massachusetts)
- Amita Bollapragada (BSc Student, University of North Carolina, Chapel Hill, North Carolina)

Technicians:

- Rebecca Aikens (2014-2017)
- Yuming Shi (2019)

Fellowships Awarded to Yildirim Lab Trainees:

Graduate Students:

Tianqi Yang: Best Poster Award, Department of Pharmacology & Cancer Biology Annual

Retreat, Duke University (2017); Regeneration Next Student Travel Award, Duke University (2019); Duke Data Science Plus (+DS) Summer Program Fellowship, Duke University (2021)

Undergraduate Students:

Dean's Summer Fellowship	Yuming Shi (2017)
URS Assistantships	Yuming Shi (2016-2020), Kevin Murgas (2016-2017), Inessa Chandra (Fall 2018), Amy Zhao and Vanessa Tam (Fall 2019, Spring 2020), Kyra Chen (Fall 2023, Spring 2024)
URS Independent Study Grant	Kevin Murgas (Spring 2016), Yuming Shi (Spring 2017), Inessa Chandra (Fall 2018), Amy Zhao (Fall 2020, Spring 2021)
Cell Biology Summer Fellowship	Yuming Shi (2017), Inessa Chandra (2018)
Student Experiential Learning Fellowship (*Duke Kunshan U)*	Semin Kim (Spring 2023)

LIST OF SELECTED PUBLICATIONS/CONTRIBUTIONS: (* Corresponding author)

I. Molecular mechanisms of X chromosome dosage compensation and impact on cancer. During my postdoctoral work, I worked on the fundamentals of epigenetic mechanisms using mammalian X-chromosome inactivation (XCI) as a model. XCI is a developmentally regulated genetic process that ensures equal dosage of X-chromosome linked gene dosage between males and females. My studies focused on dissecting the role of noncoding RNA, Xist, in mammalian development and chromatin organization in mediating transcription levels. In my lab at Duke University, we utilize mouse embryonic fibroblasts and Xist conditional knockout mouse model to determine Xist as a regulator of gene silencing during XCI maintenance during hematopoiesis.

a. Xist RNA-mediated maintenance of X-chromosome inactivation and its link to cancer. A key component of the XCI is the noncoding RNA (ncRNA) product of Xist gene, which is responsible for transcriptional silencing of one of the two X chromosomes in female mammals. My research interest centered around the poorly defined role of Xist in the maintenance of XCI. Specifically, I investigated the longstanding question of whether there is a causal link between the loss of Xist and X chromosome aneuploidies and various cancers. By deleting the Xist locus in the hematopoietic cell lineage of mice, I discovered that Xist is not only important for maintaining the transcriptionally inactive state of the inactive X chromosome but also plays an important role in hematopoietic stem cell function, and acts as a suppressor of cancer in female mice. This study provided the first direct link between Xist loss and hematologic cancers and underscored the importance of examining molecular components of XCI maintenance and Xist-mediated pathways in cancer progression, particularly in blood, breast, and ovarian cancers, providing new venues for basic and translational research to uncover ncRNA-mediated molecular mechanisms and their impact during mammalian development. *We are currently following up on these findings and investigate the cell lineage specific molecular, cellular and pathological nature of Xist deficiency and cancer during hematopoiesis.*

- Pinter, S.F., Sadreyev, R.I., **Yildirim, E.**, Jeon, Y., Ohsumi, T., Borowsky, M., and Lee, J.T. (2012). Spreading of X chromosome inactivation via a hierarchy of defined Polycomb stations*. **Genome Res.*** 10, 1864-76. DOI: 10.1101/gr.133751.111. Epub 2012 Sep 4. PMID: 22948768; PMCID: PMC3460182.
- **Yildirim, E.,** Kirby, J.E., Brown, D.E., Mercier, F.E., Sadreyev, R.I., Scadden, D.T., and Lee, J.T. (2013) Xist RNA is a potent suppressor of hematologic cancer in mice*. **Cell.*** 152, 727-742. PMCID: PMC3875356.
- Pinter, S.F., Colognori, D., Beliveau, B.J., Sadreyev, R.I., Payer, B., **Yildirim, E.,** Wu, C.T., and Lee J.T. (2015). Allelic imbalance is a prevalent and tissue-specific feature of the mouse transcriptome.

Genetics. 200, 537-549. DOI: 10.1534/genetics.115.176263. Epub 2015 Apr 9. PMID: 25858912; PMCID: PMC4492378.

- Yang, T., and **Yildirim, E.*** (2017). Epigenetic and LncRNA-Mediated Regulation of X Chromosome Inactivation and Its Impact on Pathogenesis. ***Curr Pathobiol Rep.*** DOI: 10.1007/s40139-017-0120-3.
- Yang, T., Shi, Y., and **Yildirim, E.*** (2017). Implications of Long Noncoding RNAs in Cancer Epigenetics. In "Cancer and Noncoding RNAs". ***Translational Epigenetics Series***. 1, Chapter 21: pp381-406. (Chakrabarti, J. and Sanga, M., eds), Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-811022-5.00021-8.

b. Tolerance to Xist loss in mature B cells, gut and skin. Detecting a hematopoietic specific phenotype in Xist deficient mice (Yildirim et al. 2013), one of the key questions I asked was whether this is a cell type specific phenomenon and/or what are the factors that contribute to the tolerance or susceptibility of cells to Xist loss. During my postdoctoral studies, I have initiated projects with Ms. Lin Yang, a graduate student in Jeannie Lee lab, with whom we depleted Xist in various tissues including skin and gut. I have also generated Xist knockout mice by targeting Xist in mature pro-B cells using CD19-Cre mice. Work in skin and gut systems was completed after I left the lab. I have contributed to the idea, experimental design of the below paper and carried out all the work related to Xist deficient pro-B cells. This work showed that many of the organs including skin, gut and mature B cells are tolerant to Xist loss.

- Yang, L., **Yildirim, E.** Kirby, J.E., Press, W. and Lee, J.T. (2020). Widespread organ tolerance to Xist loss and X reactivation except under chronic stress in the gut. ***Proc Natl Acad Sci USA.***117 (8): 4262-4272. PMID: 32041873; PMCID: PMC7049159.

c. Xist lncRNA is critical in gene-specific silencing during XCI maintenance and impacts lineage-specific cell differentiation and proliferation during hematopoiesis. How Xist impacts XCI maintenance remains an open question. My lab conditionally deleted Xist in hematopoietic system of mice and reported differentiation and cell cycle defects in female hematopoietic stem and progenitor cells (HSPCs). By utilizing female hematopoietic stem and progenitor cells (HSPCs) and mouse embryonic fibroblasts, we demonstrated that X-linked genes show variable tolerance to Xist loss. Specifically, XCI escape genes exhibit preferential transcriptional upregulation, which associates with low H3K27me3 occupancy and high chromatin accessibility that accommodates preexisting binding of transcription factors such as Yin Yang 1 (YY1) at the basal state. We conclude that Xist is necessary for gene-specific silencing during XCI maintenance and impacts lineage-specific cell differentiation and proliferation during hematopoiesis. *Our findings on the role of Xist in regulation of expression of XCI escape and subjective genes provide insights for novel treatment strategies of X-linked diseases through manipulating expression of specific X-linked genes on the inactive X chromosome. These findings also open new venues for us to study the mechanism of Xist-mediated silencing and determine how Xist acts in concert with cell type specific transcription factors during hematopoiesis and blood cancers.*

- Yang, T., Ou, J., and **Yildirim, E***. (2022). Xist exerts gene-specific silencing during XCI maintenance and impacts lineage-specific cell differentiation and proliferation during hematopoiesis. ***Nat Comm.*** 13, 4464. PMID: 35915095; PMCID: PMC9343370.

d. Chromatin basis for mammalian X chromosome hyperactivation. The molecular mechanisms of how mammalian X hyperactivation is achieved is not well understood. Towards this goal, I examined the relationship between level of gene expression and the occupancy of active histone marks (H3K4me3 and H3K36me3, which are active transcription marks associated with transcription initiation and transcription elongation, respectively) and RNA Pol II on the active X chromosome and the rest of the genome by performing a novel allele-specific Next-generation sequencing. This study provided evidence that there is a nonlinear association between occupancy of active histone marks, Pol II and

transcription, enhancing our understanding on the dynamics of histone modifications and how they fine tune transcription levels in the mammalian genome. It further showed that Xa hyperactivation could be explained by the enrichment of the active histone marks and Pol II. *Given that my lab has recently identified differences in the allelic binding of specific transcription factors (e.g. YY1) (Yang et al. 2022) on the X chromosome, we would like to determine how allelic enrichment of a specific transcription factor(s) contribute to the silencing and activation of X-linked genes on the inactive and active X chromosomes, respectively. We hope to define transcription factors that act downstream of Xist and define X chromosome linked network of genes that associate with female specific cancers.*

- **Yildirim, E.[#],** Sadreyev, R.I.[#], Pinter, S.F., and Lee, J.T. (2012). X-chromosome hyperactivation in mammals via nonlinear relationships between chromatin states and transcription. ***Nat Struct Mol Bio.*** 19(1), 56-61. **[#]Equal contribution**. PMCID: PMC3732781.

II. Molecular mechanisms of nucleoporin-mediated gene regulation and genome function. One of the research interests in my laboratory at Duke is to understand how components of the nuclear pore complex (NPC), called nucleoporins (Nups), impact chromatin structure and transcription in mammalian cells through their chromatin-associated function. By utilizing pluripotent embryonic stem cells and human cells, we provided new evidence showing that the NPC basket protein, Nucleoporin 153 (NUP153) influence chromatin architecture and transcription by mediating CTCF and cohesin binding at cis-regulatory elements. This effect was most prevalent at developmentally regulated bivalent genes and immediate early genes. We propose that NUP153 links the NPC to chromatin architecture allowing genes that are poised to respond rapidly to developmental cues to be properly modulated. *This work allowed us to establish a foundation for the current studies in which we are investigating how NUP153 impacts CTCF binding and how these processes impact cell type specific gene regulation during mammalian development and how these processes impact blood cancer.*

- Sun, J., Shi, Y., and **Yildirim, E.*** (2019). The Nuclear Pore Complex in Cell Type-Specific Chromatin Structure and Gene regulation. ***Trends Genet.*** 35(8): 579-588. PMID: 31213386.
- Kadota, S., Jianhong, O., Shi, Y., Lee, J.T., Sun, J., and **Yildirim, E.*** (2020). Nucleoporin 153 links nuclear pore complex to chromatin architecture by mediating CTCF and cohesin binding. ***Nat Commun***. 11(1): 2606. DOI: 10.1038/s41467-020-16394-3. PMCID: PMC7248104.