Xiaomin Bao, Ph.D.

(09/22/2020)

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EDUCATION AND EMPLOYMENT

2016 – Present: Assistant Professor, Department of Molecular Biosciences,
Department of Dermatology, Northwestern University

2008 – 2015: Postdoctoral Fellow, Department of Dermatology, Stanford University
Advisor: Paul A. Khavari, M.D., Ph.D.
Research Area: Epigenomic regulation of skin epidermal tissue homeostasis

2002 – 2008: Ph.D., Interdepartmental Genetics Program, Iowa State University
Thesis Advisor: Kristen M. Johansen, Ph.D.
Research Area: Epigenetic regulation and chromatin biology

1998 – 2002: B.S., College of Life Sciences, Zhejiang University, China
Honor Thesis: Isolation and *ex vivo* expansion of human umbilical blood stem cells

MAJOR PROFESSIONAL INTERESTS

Somatic Tissue Homeostasis, Adult Stem Cells, Differentiation, Cancer, Gene Regulation, Transcription

HONORS AND AWARDS

ESDR/SID Young Investigator Collegiality Award	2019
European Society for Dermatological Research (ESDR) Travel Award	2019
Basic Insight Award, Northwestern University	2019
Illumina Pilot Program Award, Northwestern University	2017
Skin Disease Research Center Pilot and Feasibility Award, Northwestern University	2017-2019
Cancer Center CEND Program Leader Supplemental Award	2017
NIH Pathway to Independence Award (R00 phase)	2016-2020
NIH Pathway to Independence Award (K99 phase)	2014-2015
Albert M. Kligman Fellowship	2014
NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship (F32)	2012-2014
Dean's Fellowship, Stanford University	2008
Research Excellence Award, Graduate College, Iowa State University	2008
Top College Graduates, Zhejiang Province, China	2002
First-Class Scholarship, Zhejiang University, China (ranked 1st out of 120 students)	1998-2002

PROFESSIONAL SERVICES

COMMUNITY SERVICE

- Review Editor, *Skin Cancer*, 2020-present.
- Remote Reviewer, The European Research Council Advanced Grant panel LS2 "Genetics, 'Omics', Bioinformatics and Systems Biology", 2019.
- *Ad hoc* Reviewer, NIH R01 "Molecular Genetics A" Study Section, 2019.
- Panelist for "PhD Breakout Session: Academia". PhD Retreat in The Society of Investigative Dermatology 77th Annual Meeting. 2019.
- Discussion Leader, session "Genetic and Epigenetic Determinants of Cell fate", Gordon Research Conference on Epithelial Differentiation and Keratinization. 2017.
- Discussion Leader, session "Novel Therapeutic Approaches", Gordon Research Conference on Epithelial Differentiation and Keratinization. 2013.

- ASCB (American Society for Cell Biology) Ambassador at Stanford University, 2010.
- Reviewer for journals: the *EMBO Journal*, *Developmental Cell*, *Journal of Investigative Dermatology*, *Oncotarget, Cell Cycle, Scientific Reports, Nature Communications, PNAS, iScience*

NORTHWESTERN SERVICE

- Lurie Cancer Center Research Funding Oversight Committee (Basic Science Research Subcommittee), 2018-2021.
- IBiS Admission Committee, 2019.
- Faculty Search Committee, Molecular Biosciences, 2018.
- Organizer, Interdisciplinary Biological Sciences (IBiS) Graduate Program Fall Retreat, 2017.
- Co-Organizer, Interdisciplinary Biological Sciences (IBiS) Graduate Program Fall Retreat, 2016.
- Molecular Biosciences Strategic Planning Committee 2016.

TEACHING AND MENTORING

TEACHING

- Instructor, BiolSci380: Biology of Cancer, 2017-Present (every Fall Quarter)
  CTEC overall rating:
  2019 average 5.3
  2018 average 4.7
  2017 average 4.7
- Instructor, IBiS455: Frontiers on Transcription Regulation, co-teach with Yuan He, 2019
  2019 average 4.4
- IBiS423: Ethics in Biological Research, Session on Mentoring with Chris Peterson, 2018
- IBiS423: Ethics in Biological Research, Session on Mentoring with Ishwar Radhakrishnan, 2017
- IBiS "Choosing a Postdoc" Workshop with Genia Kozorovitskiy, 2016

MENTORING

- Postdoctoral Fellow Xin Chen (Ph.D. from University of Wisconsin, 2016-present)
- Research Technician Junghun Kweon (Ph.D. From University of Minesota, 2018-present)
- Thesis advisor for IBiS graduate students: Stephenie Droll (2019-Present), Amy Neely (2018-Present), Sarah Lloyd (2017-Present), Patric Ho (2017-Present), Yujia Ding (2016-2017), Amy Reader (2016-2017).
- Rotation Graduate Students: Hanna Horton (Winter 2017), Ryan Borchert (Fall 2018), Yue Yu (Spring 2019), Nicolas Moya (Fall 2019), Kristen Rivera (Winter 2020).
- Graduate Student Thesis Committee Member for Weiting Chen (Lackner Lab), Anjali Narsing Rao (LaBonne Lab), Kristin Johnson (LaBonne Lab), Natalie Gilbert (Horvath Lab), Xiaoxiao Huang (Kelleher Lab), Erik Schad (Petersen Lab), Clare Harper (Lackner Lab), Kyle Siegel (LaBonne Lab).
- Mentor for undergraduate students: Giovanni Gamalong (2016-present), Adam Forest (2016-present), Deborah Rodiguez (2018-present), Sidney Imeroni (2018), Mary Brady (2018-present), Laura Blumensaadt (2019-present), Daniel Leon (2019-present), Sanghyon Oh (2019-present), Sara Muttar (2019-present), Jason G Irias (2019-present).

PROFESSIONAL MEMBERSHIPS

Member of SID (Society of Investigative Dermatology)
Member of ESDR (European Society for Dermatological Research)
Member of ISSCR (International Society of Stem Cell Biology)
Member of ASCB (American Society of Cell Biology)
Member of GSA (Genetic Society of America)
Member of AAAS (The American Association for the Advancement of Science)

PUBLICATIONS

(26 total, https://www.ncbi.nlm.nih.gov/myncbi/xiaomin.bao.1/bibliography/public/)

1. Hua ZY, Hansen JN, He M, Dai SK, Choi Y, Fulton MD, Lloyd SM, Szemes M, Sen J, Ding HF, Angelastro JM, Fei X, Li HP, Wu CR, Yang SY, Malik K, **Bao X**, George Zheng Y, Liu CM, Schor NF, Li ZJ, Li XG. PRMT1 promotes neuroblastoma cell survival through ATF5. *Oncogenesis*. 2020 May 15;9(5):50.
2. Ho PJ, Lloyd SM, **Bao X**. Unwinding chromatin at the right places: how BAF is targeted to specific genomic locations during development. *Development*. 2019 Sep 30;146(19).
3. Neely AE and **Bao X.** Nuclei Isolation Staining (NIS) Method for Imaging Chromatin-Associated Proteins in Difficult Cell Types. *Current Protocols in Cell Biology*. 2019.
4. Lloyd SM and **Bao X**. Pinpointing the Genomic Localizations of Chromatin-Associated Proteins: The Yesterday, Today, and Tomorrow of ChIP-seq. *Current Protocols in Cell Biology*. 2019 Sep;84(1):e89.
5. Pattison JM, Melo SP, Piekos SN, Torkelson JL, Bashkirova E, Mumbach MR, Rajasingh C, Zhen HH, Li L, Liaw E, Alber D, Rubin AJ, Shankar G, **Bao X**, Chang HY, Khavari PA, Oro AE. Retinoic acid and BMP4 cooperate with p63 to alter chromatin dynamics during surface epithelial commitment. *Nature Genetics*. 2018 Dec;50(12):1658-1665.
6. **Bao X***, Siprashvili Z, Shenoy R, Rios E, Zarnegar B, Natalie N, Qu K, Mah A, Webster D, Wozniak G, Rubin A, Tao S, Wysocka J, Khavari PA. CSNK1a1 Regulates PRMT1 to Maintain the Progenitor State in Self-renewing Somatic Tissue. *Dev Cell.* 2017 Oct23;43(2)227-239. [* Co-corresponding author]
7. **Bao X***, Rubin AJ, Qu K, Zhang J, Giresi PG, Chang HY and Khavari PA*. A novel ATAC-seq approach reveals lineage-specific reinforcement of the open chromatin landscape via cooperation between BAF and p63. *Genome Biol.* 2015 Dec 18;16(1):284. [* Co-corresponding author]
8. **Bao X**, Tang J, Lopez-Pajares V, Tao S, Qu K, Crabtree GR and Khavari PA. ACTL6a enforces the epidermal progenitor state by suppressing SWI/SNF-dependent induction of KLF4. *Cell Stem Cell*. 2013 Feb 7;12(2):193-203.
   ☆ Previewed by *Cell Stem Cell*.
   ☆ Recommended by *F1000 Prime*.
9. Cai W, Wang C, Li Y, Yao C, Shen L, Liu S, **Bao X**, Schnable PS, Girton J, Johansen J, Johansen KM. Genome-wide analysis of regulation of gene expression and H3K9me2 distribution by JIL-1 kinase mediated histone H3S10 phosphorylation in Drosophila. *Nucleic Acid Res*. 2014; 42(9):5456-67.
10. Wang C, Li Y, Cai W, **Bao X**, Girton J, Johansen J, Johansen KM. Histone H3S10 phosphorylation by the JIL-1 kinase in pericentric heterochromatin and on the 4th chromosome creates a composite H3S10phK9mes epigenetic mark. *Chromosoma.* 2014 Jun; 123(3):273-80.
11. Wang C, Yao C, Li Y, Cai W, **Bao X**, Girton J, Johansen J, Johansen KM. Evidence against a role for the JIL-1 kinase in H3S28 phosphorylation and 14-3-3 recruitment to active genes in Drosophila. *PLoS One.* 2013 Apr 30;8(4):e62484.
12. Li Y, Cai W, Wang C, Yao C, **Bao X**, Deng H, Girton J, Johansen J, Johansen KM. Domain requirements of the JIL-1 tandem kinase for histone H3 serine 10 phosphorylation and chromatin remodeling in vivo. *J Biol Chem*. 2013 Jul 5;288(27):19441-9.
13. Wang C, Cai W, Li Y, Deng H, **Bao X**, Girton J, Johansen J, Johansen KM. The epigenetic H3S10 phosphorylation mark is required for counteracting heterochromatic spreading and gene silencing in Drosophila melanogaster. *J Cell Sci.* 2011 Dec 15;124(Pt 24):4309-17.
14. Johansen KM, Cai W, Deng H, **Bao X**, Zhang W, Girton J, Johansen J. Polytene chromosome squash methods for study transcription and epigenetic chromatin modification in Drosophila using antibodies. *Methods.* 2009 Aug;48(4):387-97.
15. **Bao X**, Cai W, Deng H, Zhang W, Krencik R, Girton J, Johansen J, Johansen KM. The COOH-terminal domain of the JIL-1 H3S10 kinase interacts with histone H3 and is required for correct targeting to chromatin. *The Journal of Biological Chemistry.* 2008 Nov 21;283(47):32741-50.
16. Cai W, **Bao X**, Deng H, Girton J, Johansen J, Johansen KM. Pol II mediated transcription at active loci does not require H3S10 phosphorylation in Drosophila. *Development*. 2008 Sep;135(17):2917-25.
17. Deng H, **Bao X**, Cai W, Blacketer MJ, Belmont AS, Girton J, Johansen J, Johansen KM. Ectopic histone H3S10 phosphorylation causes chromatin structure remodeling in Drosophila. *Development.* 2008 Feb;135(4):699-705.
18. Deng H*, **Bao X*,** Zhang W, Girton J, Johansen J, Johansen KM. Reduced Levels of Su(var)3-9 but not Su(var)2-5(HP1) Counteract the Effects on Chromatin Structure and Viability in Loss-of-Function Mutants of the JIL-1 Histone HS310 Kinase. *Genetics.* 2007 Sep;177(1):79-87. (* These authors contributed equally

to this work)

19. **Bao X**, Deng H, Johansen J, Girton J, Johansen KM. Loss-of-Function Alleles of the JIL-1 Histone H3S10 Kinase Enhance Position-Effect Variegation at Pericentric Sites in Drosophila Heterochromatin. *Genetics*. 2007 Jun;176(2):1355-8.
    ✯ Selected as "issue highlights" by *Genetics* journal.
20. **Bao X**, Girton J, Johansen J, Johansen KM. The lamin Dm0 allele Ari3 acts as an enhancer of position effect variegation of the w^{m4} allele in Drosophila. *Genetica.* 2007 Mar;129(3):339-42.
21. Rath U, Ding Y, Deng H, Qi H, **Bao X**, Zhang W, Girton J, Johansen J, Johansen KM. The chromodomain protein, Chromator, interacts with JIL-1 kinase and regulates the structure of Drosophila polytene chromosomes. *Journal of Cell Science*. 2006 Jun 1;119(Pt 11):2332-41.
22. Lerach S, Zhang W, **Bao X**, Deng H, Girton J, Johansen J, Johansen KM. Loss-of-function alleles of the JIL-1 kinase are strong suppressors of position effect variegation of the wm4 allele in Drosophila. *Genetics*. 2006 Aug;173(4):2403-6.
23. Zhang W, Deng H, **Bao X**, Lerach S, Girton J, Johansen J, Johansen KM. The JIL-1 histone H3S10 kinase regulates dimethyl H3K9 modifications and heterochromatic spreading in Drosophila. *Development.* 2006 Jan;133(2):229-35.
24. Lerach S, Zhang W, Deng H, **Bao X**, Girton J, Johansen J, Johansen KM. JIL-1 kinase, a member of the male-specific lethal (MSL) complex, is necessary for proper dosage compensation of eye pigmentation in Drosophila. *Genesis*. 2005 Dec;43(4):213-5.
25. **Bao X**, Zhang W, Krencik R, Deng H, Wang Y, Girton J, Johansen J, Johansen KM. The JIL-1 kinase interacts with lamin Dm0 and regulates nuclear lamina morphology of Drosophila nurse cells. *Journal of Cell Science*. 2005 Nov 1;118(21):5079-87.
    ✯ Designated as a Faculty of 1000 paper.
    ✯ Selected as "editor's pick" by *Journal of Cell Science*.
    ✯ Chosen as the cover paper for the issue of November 2005 by *Journal of Cell Science.*
26. Deng H, Zhang W, **Bao X**, Martin JN, Girton J, Johansen J, Johansen KM. The JIL-1 kinase regulates the structure of Drosophila polytene chromosomes. *Chromosoma*. 2005 Aug;114(3):173-82.

INVITED TALKS

1. "Regulation of intronic polyadenylation through the crosstalk between CPSF and RNA binding proteins in modulating terminal tissue differentiation". CECAD, University of Cologne, Germany. 2019.
2. "Transcription termination modulates human epidermal proliferation and differentiation". 49th Annual ESDR (European Society for Dermatological Research) Meeting in Bordeaux, France. Concurrent 4: Genetics, Cell Based Therapy and Wound Healing. 2019.
3. "Transcription termination modulates keratinocyte proliferation and differentiation". Gordon Research Conference on Epithelial Differentiation and Keratinization. 2019.
4. "High CPSF expression in human epidermal progenitors suppresses terminal differentiation through alternative polyadenylation". Concurrent Session IID: Tissue Regeneration and Homeostasis. International Society of Stem Cell Biology Annual Meeting. 2019.
5. "Transcription Regulators Modulating Human Somatic Tissue Regeneration". University of California, Irvine. 2019.
6. "Transcription Regulators Governing Human Somatic Tissue Homeostasis"**.** Carbone Cancer Center. University of Wisconsin-Maddison. 2019.
7. "Decoding human tissue regeneration with genomic tools". *Cell Press* Lab Links Symposia: The genetics of human disease: from single cells to population variation. 2019.
8. "Chromatin remodeling in human somatic tissue regeneration". College of Life Sciences Seminar Series, Zhejiang University. 2019.
9. "Epigenomic regulation of epidermal stem cell maintenance and tissue regeneration". Zhejiang University Alumni Forum. 2019.
10. "Transcription termination regulates keratinocyte proliferation and differentiation". Concurrent MiniSymposium 2: Genetic Disease, Gene Regulation and Gene Therapy. The Society of Investigative Dermatology 77th Annual Meeting. 2019.

11. "Successfully navigating unspoken challenges – managing bumps in the road". PhD Retreat for Young Investigators (organized by the Society of Investigative Dermatology). 2019.
12. "Regulation of epidermal gene expression by the nuclear pore complex", Skin Disease Research Center 8th Annual Retreat, Northwestern University. 2018.
13. "Gene regulation of epidermal stem cell maintenance and tissue differentiation", Lurie Cancer Centers' Basic Science Seminars, Northwestern University. 2017.
14. "Regulation of epidermal gene expression by the nuclear pore complex", Skin Disease Research Center 8th Annual Retreat, Northwestern University. 2017.
15. "Epigenomic Regulation of Stem Cell Maintenance and Tissue Differentiation", Quantitative Approaches Development and Evolution Symposium, Northwestern university. 2016.
16. "Regulation of Progenitor Maintenance and Tissue Differentiation by Chromatin Remodeling", Department of Biochemistry and Molecular Genetics Seminar Series, Northwestern University. 2016.
17. "BAF Enables Epidermal Differentiation by p63-selective Control of the Open Chromatin Landscape". Gordon Research Seminar, Epithelial Differentiation and Keratinization, Sunday River, Newry, ME. 2015.
18. "Lineage-specific Activation of Chromatin via Mutual Reinforcement by the p63 Master Transcription Factor and the BAF Chromatin Remodeling Complex". The Society of Investigative Dermatology Annual Meeting. Atlanta, GA. 2015.
19. "Gene Regulation of Stem Cell Maintenance and Differentiation", Biochemistry and Molecular Biology Department, Bloomberg School of Public Health, Johns Hopkins University. 2015.
20. "Gene Regulation of Stem Cell Maintenance and Differentiation", Program on Genomics of Differentiation, Eunice Kennedy Shriver National Institute of Child Health and Human Development. 2015.
21. "Gene Regulation of Stem Cell Maintenance and Differentiation", CDB/VCSCB Seminar Series, Vanderbilt University. 2015.
22. "Gene Regulation of Stem Cell Maintenance and Differentiation", Center for Epigenetics & Disease Prevention Institute of Biosciences & Technology, Texas A&M University. 2015.
23. "Gene Regulation of Stem Cell Maintenance and Differentiation", Stadtman Chromosome Biology/Epigenetics Seminar, NIH. 2014.
24. "Regulation of Stem Cell Maintenance and Differentiation by Chromatin Remodeling", Department of Dermatology, Johns Hopkins University. 2014.
25. "The protein arginine methyltransferase PRMT1 acts with the CSNK1a1 kinase to enforce the epidermal progenitor state *in vivo*". The Society of Investigative Dermatology 77th Annual Meeting. Albuquerque, NM. 2014.
26. "BAF53A enforces the epidermal progenitor state by re-targeting the SWI/SNF/BAF chromatin remodeling complex away from differentiation gene promoters". The American Society for Cell Biology 52nd Annual Meeting. San Francisco, CA. 2012.
27. "BAF53A enforces the epidermal progenitor state by re-targeting the SWI/SNF/BAF chromatin remodeling complex away from differentiation gene promoters". The Society of Investigative Dermatology 75th Annual Meeting. Raleigh, NC. 2012.

RESEARCH SUPPORT

1. R01 AR075015 (Bao) 09/11/20-08/31/25
NIH/NIAMS
Epidermal Gene Regulation by Transcription Elongation and Termination
The goal of this project is to characterize the role of transcription elongation and termination regulators in epidermal tissue homeostasis.

2. K99/R00 AR065480 (Bao) 07/01/16 – 6/30/21
NIH/NIAMS
Regulators of Epidermal Gene Expression
The goal of this project is to characterize the molecular mechanisms underlying how BAF chromatin remodeling complex and PRMT1 protein arginine methyltransferase control gene expression in normal human epidermal tissue homeostasis.

3. Basic Insight Award (Bao) 04/01/19-03/31/2021
Define BAF Dysregulation in Cutaneous Squamous Cell Carcinoma
The goal of this pilot project is to identify mutations in the genes encoding BAF complex subunits and its interacting proteins in cutaneous squamous cell carcinoma.

COMPLETED
1. CEND Program Leader Supplemental Award (Bao) 05/01/17 – 04/30/19
Lurie Cancer Center at Northwestern (CEND)
Characterizing SEC and KMT2D in Squamous Cell Carcinoma Progression
The goal of this pilot project is to define the roles of transcription elongation in squamous cell carcinoma.

2. SDRC Pilot & Feasibility Study (P&F) Award (Bao) 08/01/17 – 07/30/19
Skin Disease Research Center at Northwestern
Regulation of epidermal gene expression by the nuclear pore complex (NPC)
The goal of this pilot project is to characterize the roles of nuclear pore complexes in regulating epidermal stem cell maintenance and tissue differentiation