

Edward Boyi Chuong

Curriculum Vitae

Education and Positions

Assistant Professor

University of Colorado Boulder

303-735-8573 | edward.chuong@colorado.edu

<https://chuonglab.colorado.edu> | Twitter: @edchuong

Google scholar: <https://scholar.google.com/citations?user=VLibLeMAAAAJ&hl=en>

Education

2007 - 2013 Ph.D. Genetics, Stanford University School of Medicine

2003 - 2007 B.S. Bioengineering: Bioinformatics, University of California, San Diego

Research positions

2018 - current **Assistant Professor**

Packard Fellow

BioFrontiers Institute

Department of Molecular, Cellular, and Developmental Biology

University of Colorado Boulder

2013 - 2018 **Postdoctoral fellow**

HHMI fellow of the Jane Coffin Childs Memorial Fund

Department of Human Genetics (Advisors: Dr. Cedric Feschotte, Dr. Nels Elde)

University of Utah School of Medicine

Endogenous retroviruses and immune evolution

2007 - 2013 **Graduate student**

NSF Graduate Research Fellow

Department of Genetics (Advisor: Dr. Julie Baker)

Stanford University School of Medicine

Placenta development and evolution

Research focuses: Genomics, innate immunity, transposable elements, gene regulation

Honors and Awards

2023	Regeneron Young Investigator Award, International Cytokine and Interferon Society
2022	Kavli Frontiers of Science Fellow of the National Academy of Sciences
2020 - 2025	Packard Fellowship for Science and Engineering
2019 - 2021	Sloan Research Fellow in computational and evolutionary molecular biology
2018 - 2023	NIH Maximizing Investigators' Research Award (R35) for early stage investigators
2018 - 2021	Boettcher Foundation Webb-Waring Biomedical Research Award
2018 - 2021	Marvin H. Caruthers Endowed Chair for Early Career Faculty
2014 - 2017	HHMI Postdoctoral Fellowship from the Jane Coffin Childs Memorial Fund
2014	Damon Runyon Postdoctoral Fellowship (regretfully declined)
2014	Life Sciences Research Foundation, Postdoctoral Fellowship finalist
2009	International Federation of Placenta Associations Highly Commended New Investigator
2008 - 2011	NSF Graduate Research Fellowship
2007	UCSD School of Engineering Distinguished Leadership and Service Award
2006	UCSD Chancellor's Research Scholarship

2006 Barry M. Goldwater Scholarship
2005 Amylin Pharmaceuticals Research Scholarship
2005 Phi Beta Kappa

Publications

Chuong lab members in bold

Star (*) - equal contribution

Citation counts according to Google Scholar as of July 2022

Peer-reviewed publications since joining CU as faculty in 2018

Reference

Buttler C, Ramirez D, Dowell RD, **Chuong EB**. An intronic LINE-1 regulates IFNAR1 expression in human immune cells. *Mobile DNA* (2023)

Ramirez D, **Chuong EB**, Dowell RD. Nascent transcription upon interferon- α 2 stimulation on human and rhesus macaque lymphoblastoid cell lines. *BMC Research Notes* (2023)

Horton I*, **Kelly CJ***, **Dziulko A**, **Simpson DM**, **Chuong EB**. Mouse B2 SINE elements function as IFN-inducible enhancers. *eLIFE* (2023)

McMellen A, Yamamoto T, Qamar L, Sanders B, **Nguyen L**, Chavez DO, Bapa J, Berning A, Post M, Johnson J, Behbakht K, Nurmemmedov E, **Chuong EB**, Bitler B. ATF6-mediated signaling contributes to PARP inhibitor resistance in ovarian cancer. *Molecular Cancer Research* (2022)

Kelly CJ, Chitko-McKown C, **Chuong EB**. Ruminant-specific retrotransposons shape regulatory evolution of bovine immunity. *Genome Research* (2022)

Pasquesi GIM, **Kelly CJ**, **Ordonez A**, **Chuong EB**. Transcriptional dynamics of transposable elements in the type I IFN response in Myotis lucifugus cells. *Mobile DNA* (2022)

Perry BW, Gopalan SS, **Pasquesi GIM**, Schield DR, Westfall AK, Smith CF, Koludarov I, Chippindale PT, Pellegrino MW, **Chuong EB**, Mackessy SP, Castoe TC. Snake venom gene expression is coordinated by novel regulatory architecture and the integration of multiple co-opted vertebrate pathways. *Genome Research* (2022) 32: 1058-1073

Buttler CA, **Chuong EB**. Emerging roles for endogenous retroviruses in immune epigenetic regulation. *Immunological Reviews* (2022) 305 (1), 165-178

Ivancevic A, **Chuong EB**. Transposable elements teach T cells new Tricks. *PNAS* (2020) 117: 9145-9147 [Commentary]

Branco M, **Chuong EB**. Crossroads between transposons and gene regulation. *Phil. Trans. R. Soc. B* (2020) **375**:20190330 [Commentary]

Raviram R, Rocha PP, Luo VM, Swanzey E, Miraldi ER, **Chuong EB**, Feschotte C, Bonneau R, Skok JA. Analysis of 3D genomic interactions identifies candidate host genes that transposable elements potentially regulate. *Genome Biology* (2019) 19:216

Chuong EB. The placenta goes viral: retroviruses control gene expression in pregnancy. *PLOS Biology* (2018) 16(10): e3000028 [Commentary]

Publications prior to 2018

Guernsey MW, **Chuong EB**, Cornelis G, Renfree MB*, Baker JC*. Molecular conservation of marsupial and eutherian placentation and lactation. *eLIFE* (2017) 6:e27450
[covered by perspectives in *eLIFE* and Nature News]

Chuong EB, Elde NC, Feschotte C. Regulatory activities of transposable elements: from conflicts to benefits. *Nature Reviews Genetics* (2017) 18: 71-86

Yu Y, Yarrington RM, **Chuong EB**, Elde NC, Stillman DJ. Disruption of promoter memory by synthesis of a long noncoding RNA. *PNAS* (2016) 113: 9575-9580

Chuong EB, Elde NC*, Feschotte C*. Regulatory evolution of innate immunity through co-option of endogenous retroviruses. *Science* (2016) 351: 1083-1087
[covered by perspectives in *Science* and *Current Biology*]

Hannibal RL, **Chuong EB**, Mulia JR, Gilbert DM, Valouev A, Baker JC. Copy number variation is a fundamental aspect of the placental genome. *PLOS Genetics* (2014) 10(5): e1004290

Wills AE, Gupta R, **Chuong EB**, Baker JC. Chromatin immunoprecipitation and deep sequencing in *Xenopus tropicalis* and *Xenopus laevis*. *Methods* (2014) 66(3):410-21.

Chuong EB, Feschotte C. Transposons up the dosage. *Science* (2013) 342 (6160):812-813.
[Commentary]

Chuong EB, Hannibal RL, Green SL, Baker JC. Evolutionary perspectives into placental biology and disease. *Applied & Translational Genomics* (2013) 2:64-69

Chuong EB. Retroviruses facilitate the rapid evolution of the mammalian placenta. *Bioessays* (2013) 35:10 853-861

Chuong EB, Rumi MA, Soares MJ, Baker JC. Endogenous retroviruses function as species-specific enhancer elements in the placenta. *Nature Genetics* (2013) 45: 325-329.
[covered by perspective in *Biology of Reproduction*]

Yoon SJ, Wills AE, **Chuong EB**, Gupta R, Baker JC. HEB and E2A function as SMAD/FOXH1 cofactors. *Genes and Development* (2011) 25: 1654-1661.

Kim SW*, Yoon SJ*, **Chuong EB***, Oyolu CB, Wills AE, Gupta R, Baker JC. Chromatin and transcriptional signatures for Nodal signaling during endoderm formation in hESCs. *Developmental Biology* (2011) 357 (2):495-504

Chuong EB, Tong W, Hoekstra HE. Maternal-fetal conflict: Rapidly evolving proteins in the rodent placenta. *Molecular Biology and Evolution* (2010) 27 (6):1221-1225

Turner LM, **Chuong EB**, Hoekstra HE. Comparative analysis of testis protein evolution in rodents. *Genetics* (2008) 179: 2075-2089.

Preprints

Pasquesi GIM, Allen H, Ivancevic A, Barbachano-Guerrero A, **Joyner O**, Guo K, **Simpson DM, Gapin K, Horton I, Nguyen L**, Yang Q, Warren CJ, Florea LD, Bitler BG, Santiago ML, Sawyer SL, **Chuong EB**. Regulation of human interferon signaling by transposon exonization. *bioRxiv* (2023) doi: 10.1101/2023.09.11.557241
[currently in revisions at *Cell*]

Nguyen LL[^], Watson ZL[^], Ortega R, Woodruff ER, Jordan KR, Iwanaga R, Yamamoto TM, Bailey CA, **Jeong AD**, Guntupalli SR, Behbakht K, Gbaja V, Arnoult N, **Chuong EB***, Bitler B*. Combinatory EHMT and PARP inhibition induces an interferon response and a CD8 T cell-dependent tumor regression in PARP inhibitor-resistant models. *bioRxiv* (2023) doi: 10.1101/2023.02.23.529773
[*co-corresponding; in review at *Molecular Cancer Therapeutics*]

Ivancevic A, Simpson DM, Joyner OM, Bagby SM, **Nguyen LL**, Bitler BG, Pitts TM, **Chuong EB**. Endogenous retroviruses mediate transcriptional rewiring in response to oncogenic signaling in colorectal cancer. *bioRxiv* (2021) doi:10.1101/2021.10.28.466196
[currently in review at *Science Advances*]

Book chapters

Simpson DM, Chuong EB. Genetic knockout of TE insertions by CRISPR-Cas9. *Transposable Elements. Methods in Molecular Biology, vol 2607* (2022)
doi:10.1007/978-1-0716-2883-6_17

Patents

Pasquesi GIM, Chuong EB. REGULATION OF TYPE I IFN SIGNALING BY TARGETING A DECOY RECEPTOR. US Prov App No 63/339,572.
Provisional patent filed 5/9/2022

Presentations

Conference and symposium presentations

2024	Heidelberg, Germany	EMBO Mobile Genomes conference [invited speaker]
2023	Whistler, BC Canada	Keystone Symposia on Transposable elements [invited speaker]
2023	Athens, Greece	International Cytokine and Interferon Society [Accepted talk]
2022	Boulder, CO	Colorado Molecular Cellular Oncology Retreat
2022	Asilomar, CA	Forbeck Forum: Cancer and Genomic Dark Matter [invited speaker]
2021	Palm Springs, CA	Keystone Non-Coding RNAs: Biology and Applications [invited speaker]
2020	Portland, OR (virtual)	OHSU Epigenetics Symposium [invited speaker]

2019	Boulder, CO	Colorado Chromatin and Genome Regulation meeting (Boulder, CO)
2019	Rancho Mirage, CA	FASEB Mobile DNA in Mammalian Genomes [invited speaker]
2019	Chicago, IL	Society for Investigative Dermatology [Young Investigator Lecture, Satellite Epigenetics Symposium]
2018	Pingree Park, CO	Rocky Mountain Virology Conference [talk]
2017	Geneva, Switzerland	European Society of Human Reproduction and Embryology [invited speaker]
2017	New Haven, CT	Jane Coffin Childs Memorial Fund Symposium [talk]
2017	Kyoto, Japan	Kyoto University 15th International Student Seminar [Graduate student invited speaker]
2017	Bellairs, Barbados	Workshop on Transposable Elements and Gene Regulation [invited speaker]
2016	Salt Lake City, UT	University of Utah Molecular Evolution Symposium [talk]
2015	West Palm Beach, FL	FASEB Mobile DNA in Mammalian Genomes [talk]
2015	Rio Mar, Puerto Rico	CSHL Systems Biology: Global Regulation of Gene Expression [talk]
2014	Salt Lake City, UT	University of Utah Molecular Evolution Symposium [talk]
2013	Chicago, IL	Society of Molecular Biology and Evolution [invited speaker]
2012	Stanford, CA	Stanford Genome Training Grant Symposium [talk]
2011	Geilo, Norway	International Federation of Placenta Associations [talk]
2009	Adelaide, Australia	International Federation of Placenta Associations [talk]
2005	Fairbanks, AK	Society for the Study of Evolution [talk]

Invited seminars

2023	University of Pennsylvania, PA	Paris-Philly Retroelement Interest group (virtual)
2023	University of Colorado Colorado Springs	Biology Seminar series
2022	University of California Berkeley, Berkeley, CA	MCB Seminar series
2022	University of California Santa Barbara, Santa Barbara, CA	MCDB Seminar series
2022	USDA Agricultural Research Service, Clay Center, NE	Clay Center NE Seminar series
2022	University of Colorado Anschutz Medical Center, Aurora, CO	Department of Pediatrics Perinatal-Neonatal Research Conference
2020	University of Colorado Anschutz Medical Center, Aurora, CO	Cancer Center Symposium series
2019	University of Colorado Anschutz Medical Center, Aurora, CO	Cancer Center Symposium series
2018	University of Nevada Las Vegas, Las Vegas, NV	School of Life Sciences
2018	University of Colorado Boulder, Boulder, CO	BioFrontiers Institute
2017	Fred Hutchinson Cancer Research Center, Seattle, WA	Computational Biology program
2017	University of Texas Southwestern, Dallas, TX	Green Center for Reproductive Sciences
2017	University of California Berkeley, Berkeley, CA	Department of Molecular and Cellular Biology

2017	University of Massachusetts Medical School, Worcester, MA	Program in Molecular Medicine
2016	University of California Los Angeles, Los Angeles, CA	Department of Human Genetics
2014	National Taiwan University, Taipei, Taiwan	Department of Obstetrics

Media coverage of scholarly work

“Genetic ‘freeloaders’ may play key role in immune system” by Rachel Saur, *Colorado Arts and Sciences Magazine*, August 2023 - <https://www.colorado.edu/asmagazine/2023/08/29/genetic-freeloaders-may-play-key-role-immune-system>

“How the placenta evolved from an ancient virus” by Avir Mitra, *The Pulse* - NPR, January 2020 - <https://whyy.org/segments/the-placenta-went-viral-and-protomammals-were-born/>

“Jumping genes play a big role in what makes us human” by Tina Saey, *Science News*, May 2017 - <https://www.sciencenews.org/article/jumping-genes-play-big-role-what-makes-us-human>

“Our Complicated Relationship With Viruses” by Chris Palmer, *Biomedical Beat* blog by NIH NIGMS, November 2016 - <https://biobeat.nigms.nih.gov/2016/11/our-complicated-relationship-with-viruses/>

“Everyone’s a little bit viral” interview with Vincent Rancaniello, This Week in Virology (TViV) podcast #382, March 2016 - <http://www.microbe.tv/twiv/twiv-382/>

“Study Finds Surprising Benefit of Viral DNA: Fighting Other Viruses” by Carl Zimmer, *New York Times*, March 2016 - <https://www.nytimes.com/2016/03/03/science/study-finds-surprising-benefit-of-viral-dna-fighting-other-viruses.html>

“How Viruses Infiltrated Our DNA and Supercharged Our Immune System” by Ed Yong, *The Atlantic*, March 2016 - <https://www.theatlantic.com/science/archive/2016/03/how-we-repurposed-viruses-to-defend-ourselves-from-viruses/471702/>

“Irony of Viruses” animated scientific video, *The Atlantic*, March 2016 - <https://youtu.be/Opdp5L1bVAY>

“Ancient Viruses Hidden in Your DNA Fight Off New Viruses” by Sarah Zhang, *WIRED*, March 2016
<https://www.wired.com/2016/03/ancient-viruses-hidden-human-dna-fight-off-new-viruses/>

“Viral Remnants Help Regulate Human Immunity” by Jyoti Madhusoodanan, *The Scientist*, March 2016
<https://www.the-scientist.com/daily-news/viral-remnants-help-regulate-human-immunity-33932>

“Virus Genes in Human DNA May, Surprisingly, Help Us Fight Infections” by Brian Handwerk, *Smithsonian Magazine*, March 2016
<https://www.smithsonianmag.com/science-nature/virus-genes-human-dna-may-surprisingly-help-us-fight-infections-180958276/>

“Intimate Parasites: Did Endogenous Retroviruses Drive Mammalian Placental Evolution?” *BioEssays featured video*, September 2013 - <https://www.youtube.com/watch?v=-KFleLX0Wok>