

# Arun R. Chavan, Ph.D.

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## Education

<b>Ph.D.</b> , Yale University (Ecology and Evolutionary Biology; Adviser: Dr. Gunter Wagner)	2012–2018
<b>M.Sc.</b> , Tata Institute of Fundamental Research (Biology; Adviser: Dr. Himanshu Sinha)	2009–2012
<b>B.Sc.</b> , Fergusson College, University of Pune (Biotechnology)	2006–2009

## Appointments

Yale School of Medicine (Department of Immunobiology; Adviser: Dr. Ruslan Medzhitov)	
Associate Research Scientist	2024–Current
Postdoctoral Associate	2021–2024
CRI Irvington Postdoctoral Fellow	2019–2021

## Publications

### Peer-reviewed

1. Tissue Biology: In Search of a New Paradigm  
[Annual Review of Cell and Developmental Biology 39\(1\)](#)  
Adler M\*, **Chavan AR\***, Medzhitov R (2023)  
(\*equal contribution)
2. SARS-CoV-2 infection in pregnancy is associated with robust inflammatory response at the maternal-fetal interface  
[Med 2\(5\), 591-610](#)  
Lu-Culligan A, **Chavan AR**, Vijayakumar P, Irshaid L, Courchaine EM, Milano KM, Tang Z, Pope SD, Song E, Vogels CBF, Lu-Culligan WJ, Campbell KH, Casanovas-Massana A, Bermejo S, Toothaker JM, Lee HJ, Liu F, Schulz W, Fournier J, Muenker MC, Moore AJ, Yale IMPACT Team, Konnikova L, Neugebauer KM, Ring A, Grubaugh ND, Ko AI, Morotti R, Guller S, Kliman HJ, Iwasaki A, Farhadian SF (2021)
3. Evolution of embryo implantation was enabled by the origin of decidual stromal cells in eutherian mammals  
[Molecular Biology and Evolution msaa274](#)  
**Chavan AR**, Griffith OW, Stadtmayer D, Maziarz J, Pavlicev M, Fishman R, Koren L, Romero R, Wagner GP (2020)
4. Endometrial recognition of pregnancy occurs in the grey short-tailed opossum (*Monodelphis domestica*)  
[Proc. R. Soc. B 286: 20190691](#)  
Griffith OW, **Chavan AR**, Pavlicev M, Protopapas S, Callahan R, Maziarz J, Wagner GP (2019)
5. The mammalian decidual cell evolved from a cellular stress response  
[PLOS Biology 16\(8\): e2005594](#)  
Erkenbrack EM, Maziarz JD, Griffith OW, Liang C, **Chavan AR**, Nnamani MC, Wagner GP (2018)
6. Reply to Liu: Inflammation before implantation both in evolution and development  
[PNAS 115\(1\):E3–E4](#)  
Griffith OW, **Chavan AR**, Protopapas S, Maziarz J, Romero R, Wagner GP (2017)
7. Genetic Associations with Gestational Duration and Spontaneous Preterm Birth  
[New England Journal of Medicine 377\(12\):1156–1167](#)  
Zhang G, Feenstra B, Bacelis J, Liu X, Muglia L.M, Juodakis J, Miller DE, Litterman N, Jiang PP, Russell L, Hinds DA, Hu Y, Weirauch MT, Chen X, **Chavan AR**, Wagner GP, Pavličev M, Nnamani MC, Maziarz J, Karjalainen MK, Rämetsä M, Sengpiel V, Geller F, Boyd HA,

- Palotie A, Momany A, Bedell B, Ryckman KK, Huusko JM, Forney CR, Kottyan LC, Hallman M, Teramo K, Nohr EA, Davey Smith G, Melbye M, Jacobsson B, Muglia LJ (2017)
8. The inflammation paradox in the evolution of mammalian pregnancy: turning a foe into a friend  
[Current Opinion in Genetics & Development 47:24–32](#)  
**Chavan AR**, Griffith OW, Wagner GP (2017)
  9. Embryo implantation evolved from an ancestral inflammatory attachment reaction  
[PNAS 114\(32\):E6566–E6575](#)  
Griffith OW, **Chavan AR**, Protopapas S, Maziarz J, Romero R, Wagner GP (2017)
  10. Evolution of gene expression in the uterine cervix related to steroid signaling: conserved features in the regulation of cervical ripening  
[Scientific Reports 7\(1\):4439](#)  
Wagner GP, Nnamani MC, **Chavan AR**, Maziarz J, Protopapas S, Condon J, Romero R (2017)
  11. Single-cell transcriptomics of the human placenta: inferring the cell communication network of the maternal-fetal interface  
[Genome Research 27:349–361](#)  
Pavlicev M, Wagner GP, **Chavan AR**, Owens K, Maziarz J, Dunn-Fletcher C, Kallapur SG, Muglia L, Jones H (2017)
  12. The transcriptomic evolution of mammalian pregnancy: gene expression innovations in endometrial stromal fibroblasts  
[Genome Biology & Evolution 8:2459–2473](#)  
Kin K, Maziarz J, **Chavan AR**, Kamat M, Vasudevan S, Birt A, Emera D, Lynch VJ, Ott TL, Pavlicev M, Wagner GP (2016)
  13. The fetal-maternal interface of the nine-banded armadillo: endothelial cells of maternal sinus are partially replaced by trophoblast  
[Zoological Letters 2:11](#)  
**Chavan AR**, and Wagner GP (2016)
  14. What was the ancestral function of decidual stromal cells? A model for the evolution of eutherian pregnancy  
[Placenta 40:40–51](#)  
**Chavan AR**, Bhullar B-AS, and Wagner GP (2016)
  15. Polygenic *cis*-regulatory adaptation in the evolution of yeast pathogenicity  
[Genome Research 22:1930–1939](#)  
Fraser HB, Levy S\*, **Chavan A\***, Shah HB, Perez JC, Zhou Y, Siegal ML, Sinha H (2012)  
(\*equal contribution)

## Dissertations

1. *Evolutionary origin of cell types: a case study of decidual cells in mammalian pregnancy*  
**Chavan AR** (2018). Yale University.
2. *Allelic variation in yeast: its role in cis-regulatory adaptation and its pleiotropic consequences*  
**Chavan AR** (2012). Tata Institute of Fundamental Research.

## Funding, Fellowships, and Prizes

### Fellowships and Prizes

John Spangler Nicholas Prize (for doctoral dissertation, Yale University)	2019
CRI Irvington Postdoctoral Fellowship (Cancer Research Institute, New York)	2019–2021
Finalist, Best Student Presentation Award (Society for Integrative and Comparative Biology; DEDB)	2018
Student Poster Prize (Complex Traits Symposium, Society for Molecular Biology and Evolution)	2017

### Research and Travel Grants

Travel Award (Developmental Biology of Sea Urchin and other Marine Invertebrates)	2023
Young Investigator Travel Award (Society for Molecular Biology and Evolution)	2017
Chair's Fund, Ecology & Evolutionary Biology (Yale University)	2016

Conference Travel Fellowship (Yale University)	2016
Chair's Fund, Ecology & Evolutionary Biology (Yale University)	2014

### Graduate School Funding Sources

Charles A. & June R. P. Ross Fellowship (Yale University)	2016–2017
Leo F. Rettger Fellowship (Yale University)	2014–2015
Robert W. Carle Scholarship (Yale University)	2013–2014
Junior Research Scholarship (Tata Institute of Fundamental Research, Government of India)	2009–2012

### Media Coverage

- Coverage for talk at SICB, San Francisco 2018 (now published as Chavan et al, *Mol Biol Evol* 2020)
  - Tamed immune reaction aids pregnancy, Elizabeth Pennisi, *Science* 359(6373):260
  - Armadillo and rabbit genes reveal how pregnancy evolved, Amy Maxmen, *Nature* (Republished by *Scientific American*)
  - When bad things become good: was inflammation modified to become implantation in placental mammals?, Ashley Booth, *SICB Press Release*
- Coverage for Griffith et. al, *PNAS* 2017
  - Evolution of pregnancy may be key to better reproductive technologies today, Jon Atherton, *Yale News* on July 24th, 2017
- Coverage for Pavlicev et al, *Genome Res.* 2017
  - What's in a placenta? A transcriptomic view, *PLOS Blogs* by Ricki Lewis on March 30, 2017
- Coverage for Lu-Culligan et al, *Med* 2021
  - Immune response to COVID virus may pose greater risk to pregnant women than virus itself, *Yale News* by Bill Hathaway on April 22, 2021

### Teaching

#### Teaching Fellow, Yale University

EEB 290: Comparative Vertebrate Anatomy	2014 & 2015 Spring
EEB 291L: Comparative Vertebrate Anatomy Lab	2014 & 2015 Spring
EEB 210: Introduction to Statistics: for Life Sciences	2013 Fall
EEB 225: Introduction to Evolution	2013 Spring

#### Students mentored

Meena Ambati, Yale College, New Haven CT	2022–2023
Ben Nikitin, Yale College, New Haven CT	2021–2022
Mita Kale, Glastonbury High School, Glastonbury CT	2016 Summer
Haleigh Larson, Yale College, New Haven CT	2016
Minnah Thomas, Tata Institute of Fundamental Research, Mumbai	2011 Summer

### Academic Service

#### Journal referee

BMC Genomics  
 Frontiers in Cell and Developmental Biology  
 Integrative and Comparative Biology  
 Journal of Experimental Zoology Part B: Molecular and Developmental Evolution  
 The Journal of Maternal-Fetal & Neonatal Medicine  
 Scientific Reports

## Grant reviewer

Yale Institute for Biospheric Studies Doctoral Pilot Grants	2019 & 2020
Yale Institute for Biospheric Studies Doctoral Dissertation Improvements Grants	2019 & 2020

## Presentations

### Talks (invited)

International Tunicate Meeting, Santa Cruz, CA, USA	2024
Interaction and Evolution of Organisms Seminar Series, University of Vienna, Vienna, Austria	2024
European Society for Evolutionary Developmental Biology, Uppsala, Sweden	2016

### Talks (contributed)

Amphioxus Satellite Meeting, European Society for Evolutionary Developmental Biology, Helsinki, Finland	2024
Yale Single Cell Symposium, New Haven, CT, USA	2023
Developmental Biology of Sea Urchin and other Marine Invertebrates, Woods Hole, MA, USA	2023
Amphioxus Satellite Meeting, European Society for Evolutionary Developmental Biology, Naples, Italy	2022
3rd Yale Devo-Evo Congress, New Haven, CT, USA	2022
Indian Society of Developmental Biology, IIT Kanpur, India	2018
Evo-Devo Symposium, Yale University, West Haven, CT, USA	2018
Society for Integrative and Comparative Biology, San Francisco, CA, USA	2018
West Campus Seminar Series, Yale University, West Haven, CT, USA	2017
Evo-Devo Symposium, Yale University, West Haven, CT, USA	2017
Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University, New Haven, CT, USA	2017
Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University, New Haven, CT, USA	2016

### Posters

European Society for Evolutionary Developmental Biology, Helsinki, Finland	2024
EMBO   EMBL Symposium: The identity and Evolution of Cell Types, Heidelberg, Germany	2021
EMBO   EMBL Symposium: The identity and Evolution of Cell Types, Heidelberg, Germany	2019
Society for Molecular Biology and Evolution, Austin, TX, USA	2017
Systems Biology Institute Symposium, Yale University, West Haven, CT, USA	2017
Gordon Research Conference on Mammalian Reproduction, Waterville Valley, NH, USA	2016
Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University, New Haven, CT, USA	2014
International Conference on Yeast Biology, Mumbai, India	2011

## Outreach

eMediator at The School in the Cloud (weekly Skype sessions with school students in Phaltan, India)	2015–2016
Represented the Department of Biological Sciences on Science Popularization and Public Outreach Committee, Tata Institute of Fundamental Research, India	2011–2012
Volunteered fortnightly in organizing sessions of ‘Chai and Why?’, a forum for interactive scientific discussions outside the academic setting. (Organized by Tata Institute of Fundamental Research and held at Ruia College and Prithvi Theater, Mumbai, India)	2009–2011

## Academic References

Dr. Ruslan Medzhitov (postdoctoral adviser): [ruslan.medzhitov@yale.edu](mailto:ruslan.medzhitov@yale.edu)  
Dr. Gunter P. Wagner (doctoral thesis adviser): [gunter.wagner@yale.edu](mailto:gunter.wagner@yale.edu)  
Dr. Mihaela Pavlicev (doctoral thesis committee member): [mihaela.pavlicev@univie.ac.at](mailto:mihaela.pavlicev@univie.ac.at)  
Dr. Richard O. Prum (doctoral thesis committee member): [richard.prum@yale.edu](mailto:richard.prum@yale.edu)  
Dr. Himanshu Sinha (master’s thesis adviser): [sinha@iitm.ac.in](mailto:sinha@iitm.ac.in)