Stanford

Andrew Fire

George D. Smith Professor in Molecular and Genetic Medicine and Professor of Pathology and of Genetics

Bio

ACADEMIC APPOINTMENTS

- Professor, Pathology
- Professor, Genetics
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Cancer Institute

ADMINISTRATIVE APPOINTMENTS

- Professor of Pathology and Genetics, Stanford University School of Medicine, (2003- present)
- Assistant Professor -> Professor of Biology (Adjunct), Johns Hopkins University, (1989-2009)
- Scientific Staff, Carnegie Institution of Washington, (1989-2003)
- Staff Associate, Carnegie Institution of Washington, (1986-1989)

LINKS

- Fire Lab: https://sites.stanford.edu/firelab/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

->What We Do:

Our lab studies the mechanisms by which cells and organisms respond to genetic change.

The genetic landscape faced by a living cell is constantly changing. Developmental transitions, environmental shifts, and pathogenic invasions lend a dynamic character to both the genome and its activity pattern.We study a variety of natural mechanisms that are utilized by cells adapting to genetic change. These include mechanisms activated during normal development and systems for detecting and responding to foreign or unwanted genetic activity. At the root of these studies are questions of how a cell can distinguish "self" versus "nonself" and "wanted" versus "unwanted" gene expression.

We primarily make use of the nematode C. elegans in our experimental studies. C. elegans is small, easily cultured, and can readily be made to accept foreign DNA or RNA. The results of such experiments have outlined a number of concerted responses that recognize (and in most cases work to silence) the foreign nucleic acid. One such mechanism ("RNAi") responds to double stranded character in RNA: either as introduced experimentally into the organism or as produced from foreign DNA that

has not undergone selection to avoid a dsRNA response. Much of the current effort in the lab is directed toward a molecular understanding of the RNAi machinery and its roles in the cell. RNAi is not the only cellular defense against unwanted nucleic acid, and substantial current effort in the lab is also directed at identification of other triggers and mechanisms used in recognition and response to foreign information.

->Who we are:

PI: Andrew Fire, Professor of Pathology and Genetics, Stanford University School of Medicine

Postdoctoral Fellows:

Dae-Eun Jeong (Ph.D. Pohang University of Science and Technology, Life Sciences, 2017)

Maya Kasowski (M.D./Ph.D. Yale University School of Medicine, 2016)

Matthew McCoy (Ph.D. Washington University, Molecular Genetics and Genomics 2018)

Massa Shoura (Ph.D. Univ. Texas at Dallas, Molecular-Cellular Biology 2013, Bioengineering 2014)

Lamia Wahba (Ph.D. Johns Hopkins University, Biology, 2013)

Graduate Students:

Nelson Hall (Stanford Bioengineering Ph.D. Program; B.S. MIT, 2016)

Nimit Jain (Stanford Bioengineering Ph.D. Program; B.S. Yale, 2011)

Undergraduate Students:

Alizeh Ahmad (Stanford Human Biology, 2019)

Visiting Scientist (Stanford Thinking-Matters Fellows Program):

Saumya Sankaran (Ph.D. Stanford, Biology, 2016)

Laboratory Manager:

Karen Artiles (Ph.D. UC Santa Cruz, 2008)

Laboratory Specialist:

Krisztina Perez

-> Joining The Fire Lab

We welcome new applicants to the lab.

Prospective postdoctoral applicants should send a resume and summary of research to Dr. Fire (afire <at> stanford <dot> edu), and arrange to have 3-4 letters of reference likewise sent to this address.

Prospective graduate students are encouraged to apply to the Stanford Genetics Ph.D. program (or to any of the biosciences Ph.D. programs): http://biosciences.stanford.edu/prospective/

Rotation Students: We welcome rotation students from any program at Stanford, with Spring being the preferred quarter. Email the PI.

We occasionally have positions for undergraduate researchers in the lab (especially summers, and particularly straightforward for current or incoming Stanford students). Email the PI at the above address.

Teaching

COURSES

2018-19

- Advanced Genetics: GENE 205 (Win)
- Cancer Biology Journal Club: CBIO 280 (Win)
- Genetics and Developmental Biology Training Camp: DBIO 200, GENE 200 (Aut)

2017-18

- Advanced Genetics: GENE 205 (Win)
- C. Elegans Genetics: GENE 235 (Spr)
- Computational Analysis of Biological Information: Introduction to Python for Biologists: GENE 218, MI 218, PATH 218 (Sum)

2016-17

- Advanced Genetics: GENE 205 (Win)

2015-16

- Advanced Genetics: GENE 205 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Albert Hinman

Postdoctoral Faculty Sponsor

Dae-Eun Jeong, Maya Kasowski, Matthew McCoy, Massa Shoura, Lamia Wahba

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cancer Biology (Phd Program)
- Genetics (Phd Program)
- Immunology (Phd Program)

Publications

PUBLICATIONS

- **Target-dependent nickase activities of the CRISPR-Cas nucleases Cpf1 and Cas9.** *Nature microbiology*
  Fu, B. X., Smith, J. D., Fuchs, R. T., Mabuchi, M., Curcuru, J., Robb, G. B., Fire, A. Z.
  2019
- **Assessment and Maintenance of Unigametic Germline Inheritance for C.elegans.** *Developmental cell*
  Artiles, K. L., Fire, A. Z., Frokjar-Jensen, C.
  2019
- **Maternal Ribosomes Are Sufficient for Tissue Diversification during Embryonic Development in C.elegans.** *Developmental cell*
  Cenik, E. S., Meng, X., Tang, N. H., Hall, R. N., Arribere, J. A., Cenik, C., Jin, Y., Fire, A.

2019

- **Prospective Biopsy-Based Study of Chronic Kidney Disease of Unknown Etiology in Sri Lanka.** *Clinical journal of the American Society of Nephrology : CJASN*

  Anand, S., Montez-Rath, M. E., Adasooriya, D., Ratnatunga, N., Kambham, N., Wazil, A., Wijetunge, S., Badurdeen, Z., Ratnayake, C., Karunasena, N., Schensul, S. L., Valhos, P., Haider, et al

  2019

- **A Reverse Transcriptase-Cas1 Fusion Protein Contains a Cas6 Domain Required for Both CRISPR RNA Biogenesis and RNA Spacer Acquisition.** *Molecular cell*

  Mohr, G., Silas, S., Stamos, J. L., Makarova, K. S., Markham, L. M., Yao, J., Lucas-Elio, P., Sanchez-Amat, A., Fire, A. Z., Koonin, E. V., Lambowitz, A. M.

  2018

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