

# Benjamin Adam **Catching, Ph.D**

IRTA POSTDOCTORAL FELLOW, NATIONAL INSTITUTES OF HEALTH

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Molecular Virologist, Structural Biologist, Leader.  
Former Physicist Computationally Analyzing Big Biological Data.

## Education

### University of California, San Francisco

PH.D IN BIOPHYSICS, ANDINO LAB

San Francisco, California

September 2017 - May 2022

### California State University, Chico

B.S. IN PHYSICS, MINOR IN MATHEMATICS

Chico, California

August 2011 - May 2016

## Publications

### A tradeoff between enterovirus A71 particle stability and cell entry

Published on November 17th, 2023

NATURE COMMUNICATIONS

[https://doi.org/10.1038/s41467-023-](https://doi.org/10.1038/s41467-023-43029-0)

43029-0

- First author, designed and conceived study, performed cell culture, electron microscopy, biophysical characterization, data collection, and analysis, and writing the manuscript

### Infectious viral shedding of SARS-CoV-2 Delta following vaccination: A longitudinal cohort study

Published on September 9th, 2022

PLOS PATHOGENS

<https://doi.org/10.1371/journal.ppat.1010802>

- Analysed SARS-CoV2 RNA shedding data from vaccinated and unvaccinated clinical isolates from a kinetic perspective

### A defective viral genome strategy elicits broad protective immunity against respiratory viruses

Published on December 9th, 2021

CELL

<https://doi.org/10.1016/j.cell.2021.11.023>

- Collected electron and fluorescent microscopy images, performed all tissue culture experiments on rhinoviruses

### Experimental and mathematical insights on the interactions between poliovirus and a defective interfering genome

Published on September 27th, 2021

PLOS PATHOGENS

<https://doi.org/10.1371/journal.ppat.1009277>

- Collected negative stain EM images of virus particles, worked on mathematical model.

### Examining face-mask usage as an effective strategy to control COVID-19 spread.

Published on August 6th, 2021

SCIENTIFIC REPORTS

[https://doi.org/10.1038/s41598-021-](https://doi.org/10.1038/s41598-021-94960-5)

94960-5

- Co-first author. Designed, ran, and analyzed simulation data for pandemic conditions with difference levels of adherence to face-masks and social distancing.

### Mapping Attenuation Determinants in Enterovirus-D68.

Published August 8th, 2020

VIRUSES, VOLUME 12, ISSUE 8

<https://doi.org/10.3390/v12080867>

- Helped with data analysis and helped set up of simulation for virus mutants

## **Robust Sequence Determinants of $\alpha$ -Synuclein Toxicity in Yeast Implicate Membrane Binding .**

Published July 27th, 2020

ACS CHEMICAL BIOLOGY, VOLUME 15, ISSUE 8

<https://doi.org/10.1021/acscchembio.0c00339>

- Ran mutational and chemical perturbations against protein in question in Yeast two hybrids

## **A Type IV-A CRISPR-Cas system in *Pseudomonas aeruginosa* mediates RNA-guided plasmid interference *in vivo***

Published December 2019

THE CRISPR JOURNAL, VOLUME 2, ISSUE 6

<https://doi.org/10.1089/crispr.2019.0048>

- Developed bioinformatic pipeline to analysis putative CRISPR type IV systems while rotating in the lab of Dr. Bondy-Denomy of UCSF

## **Human Phageprints: A high-resolution exploration of oral phages reveals globally-distributed phage families with individual-specific and temporally-stable community compositions**

Deposited in Jan. 2019, in review at  
PNAS

*bioRxiv*

<https://www.biorxiv.org/content/10.1101/516864v1>

- Collected, isolated, and prepared oral genomic samples from human subjects as a lab tech in the lab of Dr. Phillips of Caltech

## **Magnetic Viscous Drag for Friction Labs**

Published Sep. 2016

THE PHYSICS TEACHER, VOL. 54

<https://aapt.scitation.org/doi/10.1119/1.4961172>

- Research with Dr. Gaffney of CSU Chico on magnet sliding down non-ferric conducting slab as a friction lab

## **Performance of Metal-Coated Mirrors with Different Protective Dielectric Layers, Part 1: Experiment**

Presented Apr. 2014

CSU CHICO COLLEGE OF NATURAL SCIENCES POSTER SESSION

- Comparison of coating and metal's effect on polarization from rotation of azimuthal and elevation mirrors with Dr. Petrova-Mayor of CSU Chico

## **Addressing Students' Difficulties in Charging by Induction: Creation of Experimental Videos**

Presented Aug. 2013

AAPT SUMMER MEETING POSTER SESSION

- Investigated effects of video demonstration as a learning device for teaching electromagnetic induction with Dr. Zou of CSU Chico

# **Experience**

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## **National Institutes of Health, National Institutes of Allergy and Infectious Disease**

Bethesda, Maryland

POSTDOCTORAL FELLOW, QUANTITATIVE VIROLOGY AND EVOLUTION UNIT

June 2022 - Present

- Design and lead research projects regarding the evolution of +ssRNA viruses
- Mentor and develop lab trainees (e.g. Graduate Students, Postbacs)
- Collaborate with extramural research programs on enterovirus D68

## **California Institute of Technology**

Pasadena, California

LAB TECHNICIAN IN THE PHILLIPS GROUP

Aug. 2016 - Aug. 2017

- Assist in oral sample collection, preparation , and analysis pertaining to a 100 day experiment
- Head Teaching Assistant for the Spring 2017 class: Bi 1X, Great Ideas of Biology

## **Marine Biological Laboratory**

Woods Hole, Massachusetts

PHYSICAL BIOLOGY OF THE CELL COURSE ASSISTANT

Sep. 2016 - October 2016

- Set up course, ensured all materials and apparatus arrived or were procured on time
- Coordinated course events and transitions
- Student in course, worked with Greg Huber of KITP (now Chan Zuckerberg Biohub) on membrane physics of archaeal virus capsids

## **Marine Biological Laboratory**

### PHYSIOLOGY COURSE ASSISTANT

- Organized and optimized lab space and equipment
- Took part of course classes and attended all course lectures

*Woods Hole, Massachusetts*

*Summers of 2014, 2015, and 2016*

## **California State University, Chico, Physics Department**

### TEACHER'S ASSISTANT

- Assisted Dr. Ayars, Dr. Gaffney, Dr. Arpin, Dr. Anderson
- Graded papers, assisted in lab, proctored tests

*Chico, California*

*Aug. 2013 - May 2016*

## **California State University, Chico, Physics Department**

### STOCKROOM ASSISTANT

- Set up lower-division labs under Mrs. Mary Waldorf

*Chico, California*

*Aug. 2012 - Dec. 2013*

## Affiliations

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### American Society of Virology

*Member since January 2020*

- Presentation  
Temperature selection in enterovirus D68 and enterovirus A71: Genetic metastability of a multifunctional protein  
American Society for Virology 39th Annual Meeting  
Picornavirus structure, therapeutics and epidemiology Session
- Poster  
High-Throughput Passaging of EV-D68 under Diverse Cellular Environments  
American Society for Virology 42nd Annual Meeting  
Evolution, Ecology, and Reservoirs Session

### Biophysical Society

*Member since October 2021*

- Poster  
EVOLUTIONARY TRADEOFF OF ENTEROVIRUS A71 THERMOSTABILITY AND CELL ENTRY  
Biophysical Society 66th Annual Meeting  
San Francisco, CA
- Poster Session Judge  
Undergraduate Poster Award Competition  
Biophysical Society 66th Annual Meeting  
San Francisco, CA
- Volunteer  
Attendance Counter  
Biophysical Society 66th Annual Meeting  
San Francisco, CA

### American Physical Society

*Member since October 2021*

- Presentation  
Evolutionary Tradeoff of Enterovirus A71 Thermostability and Cell Entry  
American Physical Society March 2022 Meeting  
Ecological and Evolutionary Dynamics I Session  
Chicago, IL
- Poster  
Examining the interplay between face mask usage, asymptomatic transmission, and social distancing on the spread of COVID19  
American Physical Society March 2022 Meeting  
Poster Session II  
Chicago, IL

## Extracurricular Activity

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### National Institute of Allergy and Infectious Disease

*Bethesda, Maryland*

NATIONAL INSTITUTES OF HEALTH

- Fellows Advisory Committee March 2023 - Present  
Judge for 3-Minute Talk competition  
Assisted with the planning, judging, and moderating of the 2023 Annual Workshop

## Graduate and Professional Student Association

San Francisco, California

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

- External Vice President September 2018 - May 2020
  - Graduate Division Representative
  - Member of the University of California Graduate and Professional Council
  - Member of University of California President Student Advisory Committee
- President May 2020 - September 2021
  - President of the UCSF student body
  - Member of the University of California Council of Presidents, led items at quarterly meeting with UC President
  - Student representative of UCSF Alumni Association
  - Member of Student Service Fee Advisory Committee
  - Student representative on Suicide Prevention Advisory Group
  - Collaborated with UCSF Office of Community and Government Relations for student advocacy
  - Served on Vice Provost for Academic Affairs Selection Committee

## Associated Students of the Graduate Division

San Francisco

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

- Student Affairs Officer September 2018 - May 2019
  - Determine the state of graduate student affairs through attendance of outside student meetings

## Biophysics Program

San Francisco, California

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

- Peer Mentorship Program August 2019 - June 2022
  - Mentored two first-year graduate students
- Diversity, Equity, and Inclusion Working Group September 2021 - June 2022
  - Member of initial formation of group
  - Leveraged prior contacts and knowledge of UCSF powermaps to navigate enhance DEI training requirements for faculty

## Science and Health Education Partnership

San Francisco

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

- Classroom Partnership Volunteer March to April 2018
  - Created and implemented a four day physics lesson plan for two classrooms at Balboa High School, San Francisco, Ca

## Society of Physics Students

Chico, California

CALIFORNIA STATE UNIVERSITY, CHICO CHAPTER

Member from 2011 to 2016

- President Aug. 2015 - May 2016
  - Chapter won Marsh White Outreach Award
  - Oversaw successful 28th Annual Pumpkin Drop
  - Catalyzed First CSU Chico, College of Natural Sciences, Science Day
  - Oversaw Second Annual SPS Pi Day
  - Coordinated tutoring schedule
  - Organized student participation in selection of new department physics professors
- Executive Vice President Aug. 2013 - May 2014
  - Assisted President
  - Helped with Pumpkin Drop
- Vice President of Communications Aug. 2012 - May 2013
  - Maintained website, took meeting notes

## ΑΣΦ Fraternity

Chico, California

ΕΨ CHAPTER

Initiated Nov. 2012

- Housing Director Jan. 2014 - May 2014
  - Liaison between house occupants and landlord
  - Responsible for maintenance and bill payment
- Philanthropy Director Jan. 2013 - May 2013
  - Attended Ralph F. Burns Leadership Institute
  - Planned and executed "Donuts for Dogs" weeklong fundraiser for Canine Companions for Independence

## California State University, Chico Interfraternity Council

NATIONAL INTERFRATERNITY CONFERENCE MEMBER

*Chico, California*

*Board Member from Aug. 2014 to May*

*2015*

- President Aug. 2014 - May 2015
  - Presided as chair of executive council
  - Facilitated weekly meetings between Executive Council and Chapter Presidents Council
  - Guided reformation of Bylaws and Constitution
  - Became nationally recognized through NIC
  - Oversaw first IFC recruitment week
  - Participated in Chico NIC leadership retreat
  - Dealt with Theta Chi Fraternity disaffiliating from IFC

## Honors & Awards

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2016    **Recipient**, Outstanding Student Leader Award

*CSU Chico, College  
of Natural Sciences*

2015    **Recipient**, Archon Award

*CSU Chico, Greek  
Life Office*