

## **YEE-HUNG MARK CHAN, PhD**

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### **EDUCATION**

- Ruth L Kirchstein National Research Service Postdoctoral Fellow** 2008-14  
University of California, San Francisco      Advisor: Prof. Wallace Marshall  
*Research summary:* Studied cellular regulation of organelle size and morphology utilizing various techniques applied to the model system of the budding yeast vacuole.
- Ph.D. in Chemistry** 2002-08  
Stanford University      Advisor: Prof. Steven Boxer  
*Thesis:* Interactions between lipid vesicles mediated by DNA oligonucleotides
- B.A. in Chemistry with high honors** 1997-2001  
Harvard University

### **PROFESSIONAL POSITIONS**

- Assistant Professor** 2015-  
San Francisco State University, Department of Biology  
*Research summary:* My lab studies how organelle size & shape depend on factors including feedback regulation, and how organelle size & shape affect function.

### **GRANTS AND AWARDS**

- NSF-STC: Science and Technology Center** 2016-21  
*Role:* SFSU Site Director (*PIs:* Wallace Marshall, Zev Gartner)  
*Title:* "Center for Cellular Construction"  
I coordinate scientific efforts between SFSU and partners including UCSF to develop a new field of cellular engineering. \$24,000,000 total direct and indirect costs.
- NIH-SC2: Support of Competitive Research Award** 2016-19  
*Role:* Principal Investigator  
*Title:* "Feedback in organelle size regulation"  
By advancing our knowledge of the fundamental connection between lysosome/vacuole structure and function, this proposal contributed to the development of tools to diagnose and understand the progression of disease. \$462,000 total direct and indirect costs.
- Postdoctoral Teaching Fellowship** 2013  
UCSF award for teaching medical students
- Herbert W. Boyer Postdoctoral Fellowship** 2009  
UCSF award for outstanding postdoctoral fellows
- German Exchange Fellowship, DAAD** 2001-02  
Fellowship given to graduating seniors to perform a year-long project in Germany
- Magna cum laude, Harvard University** 2001

Submitted and planned applications

7. **NSF: Major Research Instrumentation Award (submitted)** 2020  
*Role:* Co-Principal Investigator (*PI:* Diana Chu)  
*Title:* "Acquisition of an Advanced Confocal Microscope System for Research and Research Training at San Francisco State University"  
Research summary: This award is to purchase a state-of-the-art fluorescence microscope to allow research groups across the university to pursue novel directions \$755,907 total costs
8. **NSF-STC: Science and Technology Center (submitted)** 2021-26  
*Role:* SFSU Site Director (*PIs:* Wallace Marshall, Zev Gartner)  
*Title:* "Center for Cellular Construction"  
This application is for a renewal of the NSF-STC award for another 5 year period. I would continue my efforts as SFSU Site Director.
9. **NSF: CAREER Award (planned)** 2021-26  
*Role:* Principal Investigator  
*Title:* "Effects of environmental and optogenetic disruption of vacuole structure"  
This award would fund projects using a variety of methods to perturb vacuole size and determine the effect on size regulation and organelle function.

**PUBLICATIONS**

1. Chadwick WL\*, Biswas SK, Bianco S, **Chan Y-HM**. "Non-random localization of vacuoles in *Schizosaccharomyces pombe*." Accepted at Physical Biology. 2020  
*\*Master's student co-author*
2. Bianco S, **Chan, Y-HM**, Marshall WF. "Towards computer-aided design of cellular structure." Physical Biology 17, 023001 2020
3. **Chan Y-HM**, Reyes L\*, Sohail SM\*, Tran NK\*, and Marshall WF. "Organelle Size Scaling of the Budding Yeast Vacuole by Relative Growth and Inheritance." 2016  
Current Biology 26, 1221–1228.  
*\*undergraduate student co-authors*
4. **Chan Y-HM**. "Growth: A Model for Establishing Cell Size and Shape." Current Biology 26, R756-R777. 2016
5. **Chan Y-HM** and Marshall WF. "Organelle size scaling of the budding yeast vacuole is tuned by membrane trafficking rates." Biophysical Journal 106, 1986-96. 2014
6. Arigovindan M, Fung JC, Elnatan D, Mennella V, **Chan Y-HM**, Pollard M, Branlund E, Sedat JW, and Agard DA. "High-resolution restoration of 3D structures from widefield images with extreme low signal-to-noise-ratio." Proceedings of the National Academy of Sciences USA 110, 17344–17349. 2013
7. Rafelski SM, Viana MP, Zhang Y, **Chan Y-HM**, Thorn KS, Yam P, Fung JC, Li H, Costa L da F, and Marshall WF. "Mitochondrial Network Size Scaling in Budding Yeast." Science 338, 822–824. 2012
8. **Chan Y-HM** and Marshall WF. "How Cells Know the Size of Their Organelles." Science 337, 1186–1189. 2012
9. **Chan Y-HM** and Marshall WF. "Threshold-free method for three-dimensional segmentation of organelles." In SPIE Conference Proceedings, pp. 822529–7. 2012
10. **Chan Y-HM** and Marshall WF. "Scaling properties of cell and organelle size." Organogenesis 6, 88–96. 2010

11. Chung M, Lowe RD, **Chan Y-HM**, Ganesan PV, and Boxer SG. “DNA-tethered membranes formed by giant vesicle rupture.” *J Structural Biology* 168, 190–199. 2009
12. **Chan Y-HM**, Lengerich B van, and Boxer SG. “Effects of linker sequences on vesicle fusion mediated by lipid-anchored DNA oligonucleotides.” *Proceedings of the National Academy of Sciences USA* 106, 979–984. 2009
13. **Chan Y-HM**, Lengerich B van, and Boxer SG. “Lipid-anchored DNA mediates vesicle fusion as observed by lipid and content mixing.” *Biointerphases* 3, FA17–21. 2009
14. **Chan Y-HM**, and Boxer SG. “Model membrane systems and their applications.” *Current Opinion in Chemical Biology* 11, 581–587. 2007
15. **Chan Y-HM**, Lenz P, and Boxer SG. “Kinetics of DNA-mediated docking reactions between vesicles tethered to supported lipid bilayers.” *Proceedings of the National Academy of Sciences USA* 104, 18913–18918. 2007
16. Lenz P, Johnson JM, **Chan Y-HM**, and Boxer SG. “Tension-induced pore formation and leakage in adhering vesicles.” *Europhysics Letters* 75, 659–665. 2006
17. Yoshina-Ishii C, **Chan Y-HM**, Johnson JM, Kung LA, Lenz P, and Boxer SG. “Diffusive Dynamics of Vesicles Tethered to a Fluid Supported Bilayer by Single-Particle Tracking.” *Langmuir* 22, 5682–5689. 2006
18. **Chan, Y.-H. M.**, Schweiss, R., Werner, C., and Grunze, M. “Electrokinetic Characterization of Oligo- and Poly(ethylene glycol)-Terminated Self-Assembled Monolayers on Gold and Glass Surfaces.” *Langmuir* 19, 7380–7385. 2003

*Papers with teaching & pedagogy focus*

19. Zimmerman T, Barrera-Velasquez A\*, Cisneros R\*\*, Martin A\*\*, Ruiz D\*\*, Samperio E\*, Sanchez A\*, Phillips M, Esquerria RM, **Chan Y-HM**. “Optical Engineering: Deployment of a novel holographic microscope in an undergraduate CURE course.” In preparation. In prep  
*\*undergraduate and \*\*Master’s student co-authors*
20. Harrison CD, Nguyen TA, Seidel SB, Escobedo AM, Hartman C, Lam K, Liang KS, Martens M, ... **Chan Y-HM**... Domingo C, Schinske JN, and Tanner KD. “Investigating Instructor Talk in Novel Contexts: Widespread Use, Unexpected Categories, and an Emergent Sampling Strategy.” *CBE—Life Sciences Education*. 18(3):ar47. (Note: 77 total co-authors) 2019
21. Owens MT, Trujillo G, Seidel SB, Harrison CD, Farrar KM, ... **Chan Y-HM**, ... Kelley LA, Domingo CR, Tanner KD. “Collectively Improving Our Teaching: Attempting Biology Department-wide Professional Development in Scientific Teaching.” *CBE Life Sciences Education* 17: pii: ar2. (Note: 69 total co-authors) 2018
22. Owens MT, Seidel SB, Wong M, ... **Chan, Y-HM**, ... Harrison, CD, Kelley, LA, Trujillo, G, Domingo, CR, Schinske, JN, Tanner, KD. “Classroom Sound Can Be Used To Classify Teaching Practices in College Science Courses.” *Proceedings of the National Academy of Sciences* 114, 3085-3090. (Note: 83 total co-authors) 2017

**MAJOR SERVICE ACTIVITIES**

1. **NSF Cell Dynamics and Function subgroup panelist** 2020  
I reviewed ~30 NSF applications, including writing reviews for the program officer, in-depth discussion with other panelists, and co-writing summary statements.

2. **Cellular Engineering Research Workshop** 2019-  
I co-direct a two-week, intensive workshop providing 20+ MS & BS students opportunities to conduct cross-disciplinary research in cell & molecular biology, computer science, and engineering.
3. **qBio 2019 Program & Local Organizing Committee** 2018-19  
This conference was hosted at SFSU by the Center for Cellular Construction and included 200+ attendees over 4 days. Responsibilities included reviewing abstracts, programming & logistics.
4. **Mentor for IRACDA Scholars Program** Sp18  
I mentored Erica Sanchez, a UCSF postdoctoral fellow, in the Institutional Research and Academic Career Development Award, to help her prepare Cell Biology class sessions.
5. **Member, Biology faculty search committee** 2017-18  
The committee conducted in-depth evaluations of 150+ candidates, contributing to the successful hires of two new Cell & Molecular Biology faculty.
6. **NSF STC Center for Cellular Construction, SFSU Site Director** 2016-  
My efforts bring together SFSU faculty and students with other members from UCSF, UC Berkeley, Stanford, IBM Almaden and the Exploratorium to coordinate research and broader impact efforts
7. **NSF workshop: Quantifying Cellular Dynamics, Half Moon Bay** 2016  
This intensive, 2-day workshop had roughly 40 attendees
8. **Co-organizer, Department of Biology Research Retreat** 2016-17  
This annual retreat is attended by 100+ faculty, staff, and students to share their scientific results and foster collaborations in the department.
9. **Manuscript review** ongoing  
I have reviewed for Current Biology and Soft Matter.

### **INVITED PRESENTATIONS**

1. **NSF STC site visit**, Center for Cellular Construction 2020  
*"Engineering of vacuole size and impact on biochemical storage and function"*
2. **UC, San Francisco**, Center for Cellular Construction, Quarterly meeting 2019  
*"CCC Summer Course 2019" co-presented with Diana Chu*
3. **NSF STC site visit**, Center for Cellular Construction 2019  
*"Robustness of vacuole biochemical function"*
4. **UC Davis**, Dept of Biology Seminar 2019  
*"Organelle Size Regulation in Budding and Fission Yeast"*
5. **NSF STC site visit**, Center for Cellular Construction 2018  
*"Robusness of vacuole biochemical function"*
6. **UC, San Francisco, Dept. of Cell and Tissue Biology** seminar 2018  
*"Pathways regulating vacuole size in budding yeast"*
7. **NSF STC site visit**, Center for Cellular Construction 2017  
*"Yeast as a Living Bioreactor and Cellular Sentinel"*
8. **San Jose State University, Dept. of Biology** Seminar 2017  
*"Organelle Size Control in Cells"*
9. **UC, San Francisco**, Center for Cellular Construction, Quarterly meeting 2017  
*"Vacuole Size: Effects on pH and Cell Cycle Dependence"*
10. **University of San Francisco, Dept. of Biology** Seminar 2017  
*"Organelle Size Control in Cells"*

11. **IBM Almaden Research Center, Bianco Group** lab meeting 2017  
*“Organelle Size Control in Cells”*
12. **SFSU Biology Department retreat** 2016  
*“Pathways regulating vacuole size in budding yeast”*
13. **NSF Quantifying Cellular Dynamics workshop** 2016  
*“Regulations of organelle size in budding yeast”*
14. **NSF STC site visit**, Center for Cellular Construction 2015  
*“The Living Bioreactor”*

### **CONFERENCE PRESENTATIONS**

15. **American Society for Cell Biology**, Annual Meeting 2019  
Poster, *“An Intensive Cellular Engineering Summer Research Course Promoting Interdisciplinary Learning”*
16. **American Society for Cell Biology**, Annual Meeting 2015  
Poster, *“Recovery of vacuole size after perturbation by nutrient starvation”*

### **COURSES TAUGHT**

1. **BIOL/CHEM677 – Introduction to Optical Engineering for the Biological Sciences**  
This upper-division laboratory teaches students to construct, improve, and deploy microscopes from inexpensive components.
2. **BIOL861 – Advances in Cell and Molecular Biology, Fluorescence Microscopy**  
This graduate seminar discusses new advances in microscopy techniques, and its primary goals are to engage students in scientific literature and develop presentation skills.
3. **BIOL351GW – Experiments in Cell and Molecular Biology**  
This is the capstone, upper-division, lecture + laboratory course required for undergraduate CMB majors. It includes laboratory & writing exercises that fulfill the GVAR requirement.
4. **BIOL350 – Cell Biology**  
This is an upper-division lecture course requirement for undergraduate Cell & Molecular Biology and Physiology majors that includes topics on cell structure and function.

### **UNDERGRADUATE STUDENTS MENTORED (22 Total, 3 current)**

<i>NAME</i>	<i>PROJECT</i>	<i>OUTCOME</i>	<i>DATE</i>
1. Ryan Acbay	Impact of metal toxicity on vacuoles	MS SFSU	Fa19-Sp20
2. Adilene Rodriguez	Vacuole size impact on synthetic yield		Fa19-
3. Anyce Godoy	Vacuole size impact on pH		Su19-
4. Ramon Rodriguez	Impact of metal toxicity on vacuoles	MS SFSU	Sp19-Sp20
5. Adrian Barrera-Velasquez	Organelle interactions in budding yeast	MS SFSU	Fa18-Sp20
6. Maura de Jesus	Vacuole structure in fission yeast		Su18-
7. Thanh Quach	Impact of metal toxicity on vacuoles	MS SFSU	Su18-Fa19
8. Addison Yu	New tools for measuring vacuole pH	BS completed	Fa17-Fa18
9. Emily Zepeda	Shadowed Master's student	BS completed	Fa17-Sp17
10. Angeline Chemel	Vacuole inheritance patterns	MS SFSU	Fa17-Sp17
11. Ruby Dickinson	Shadowed Master's student	BS completed	Su17-Sp17
12. R. Carlos Segura	Vacuole size impact on pH	PhD UW	Su17-Sp19
13. Gerardo Amador	Vacuole inheritance patterns	BS completed	Su16-Fa17
14. Presley Jackson	Receptor downregulation	BS completed	Su16-Su17
15. Jean Luke Campos	Vacuole size impact on pH	PhD UW	Sp16-Su18
16. Steven Hansberry	Vacuole inheritance patterns	MS SFSU	Fa15-Su16

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Department of Biology

San Francisco State University  
Curriculum Vitae

17. William Chadwick	Vacuole size regulation	MS SFSU	Su15-Su16
18. Nancy Tran	Vacuole size regulation	BS completed	Sp16-Fa16
19. Lorena Reyes	Vacuole size regulation	BS completed	Sp15-Fa16
20. Saba Sohail	Vacuole size regulation	MS SFSU	Sp15-Fa15
21. Rachel Porter	Vacuole inheritance patterns		Su18
22. Jamie Calma	Vacuole size impact on pH		Su18

**MASTER'S STUDENTS MENTORED (7 total, 4 current)**

<u>NAME</u>	<u>THESIS PROJECT</u>	<u>OUTCOME</u>	<u>DATES</u>
1. Ryan Acbay	Vacuole size homeostasis		2020-
2. Ramon Rodriguez	Metal stress effects on vacuole size		2020-
3. Emily Conrad	Organelle size regulation in fission yeast		2019-
4. Gabriela Alvarez-Azanedo	Cell engineering to enhance biosynthesis		2018-
5. Angeline Chemel	Vacuole Inheritance and Biogenesis in <i>S. cerevisiae</i>	PhD UCSF	2018-20
6. Jasmine Sims	Elucidating the effects of the cell cycle on vacuole size in <i>S. cerevisiae</i>	PhD UCSF	2017-19
7. William Chadwick	Size and localization of vacuoles in fission yeast	PhD Yale	2016-19