DIANYI LIU

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HIGHLIGHTS

A curious researcher in Plant Science.
A talented bench worker that designs and conducts sophisticated experiments.
A passionate pop science translator that brings the world's ideas and knowledge into Mandarin Chinese.
A fun chaser enjoying dancing, bodybuilding, painting, and learning languages for the quality of life.

TECHNIQUES AND SPECIALIZATIONS

Specialization
Genetics, Cell Biology, Molecular Biology, Microscopy, Microbial Biology, Plant Biology
Cell Size Control, Mitosis, Multiple Fission
Chlamydomonas, Volvocine Algae, Cell Synchronization, Retinoblastoma Tumor Suppressor Pathway

Languages
Mandarin Chinese - Native Language
English - Professional Working Language
Japanese – Intermediate/Advanced Level - Japanese Language Proficiency Test, Level 2 **(日本語能力試験 N2)**

Statistics and Data Analysis
R Programming for data joining and data manipulation including statistics fundamentals (data analysis, correlation, regression, and inference) and data visualization (using packages ggplot2, base R, and lattice)

EDUCATION

University of Missouri, St. Louis. MO — 2015.8 - Present
Ph.D. Candidate in Cell and Molecular Biology — **GPA 4.0/4.0**

Washington University, St. Louis, MO — 2012.8 - 2015.5
M.S. in Plant and Microbial Biology

Stony Brook University, Stony Brook, NY — 2010.8 - 2012.5
B.S. in Biology, Developmental Genetics Specialization
- **Graduated with Honors** in Biology
- **Irwin Oster Award**, Excellence in Genetics Research
- **Outstanding Undergraduate Achievement**, Developmental Genetics Specialization

Nanjing University, Nanjing, Jiangsu, China — 2008.9 - 2010.6
B.S. in Biology
- **National Scholarship**, Tier 1, Year of 2010
- **National Scholarship**, Tier 2, Year of 2009

RESEARCH EXPERIENCE

Graduate Thesis Research 2012.8 - Present
Dr. James Umen's lab. Donald Danforth Plant Science Center
Thesis: Elucidating the cell size control mechanism in *Chlamydomonas reinhardtii.*

- Used a data-mining strategy to identify highly expressed genes in Chlamydomonas whose flanking sequences were tested for the ability to drive heterologous nuclear transgene expression.
- Identified a sizer protein, CDKG1, that acts through the retinoblastoma tumor suppressor pathway as a D-cyclin-dependent RB kinase to regulate mitotic counting in Chlamydomonas.
- Characterized a sizer protein TNY1, which modulates cell-size homeostasis through cell-cycle-controlled synthesis and dosage-dependent repression of the size activator CDKG1.
- Measured the nuclear:cell volume ratio in wild-type Chlamydomonas and size mutants throughout the multiple fission cell cycle using fluorescence microscopy.
- Established stochastic models for growth and division to elucidate the functions of both commitment and mitotic sizers in the size homeostasis of Chlamydomonas.

Undergraduate Research 2010.9 - 2012.5
Dr. Vitaly Citovsky's lab. Dept. of Biochemistry and Molecular Biology, **Stony Brook University**
Thesis: Improve the transgene efficiency in *Lemnaceae lemna gibba*.

- Compared pathogenic interactions between agrobacterium and *E.coli* on *Solanum lycopersicum.*
- Improved transgene method on *Lemnaceae* (increased transgene efficiency from 20% to 80%), based on floral dip method on *Arabidopsis thaliana* (Cooperated with **Dr. Jörg Schwender's lab** at **Brookhaven National Laboratory**, NY).

MANUSCRIPTS

Scientific Journal Articles

[1] (In prepration for *Current Biology*) **Liu, D.**, García, C., Singh A., and Umen, J.G. Stochastic hybrid system approach to elucidate a cellular counting and sizing mechanism in Chlamydomonas.

[2] (In prepration for the *Plant Cell*) **Liu, D.,** Lopez-Paz, C., Li, Y., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway.

[3] (In prepration for *Plos One*) **Liu, D.** and Umen, J.G. Testing the constancy of the nuclear: cell volume ratio in Chlamydomonas.

[4] Lopez-Paz, C.*, **Liu, D.*,** Geng, S., and Umen, J.G. (2017). Identification of Chlamydomonas reinhardtii endogenous genic flanking sequences for improved transgene expression. ***The Plant Journal****: for cell and molecular biology* 92, 1232-1244. (*co-first author)

[5] Li, Y.*, **Liu, D.*,** Lopez-Paz, C., Olson, B.J., and Umen, J.G. (2016). A new class of cyclin dependent kinase in Chlamydomonas is required for coupling cell size to cell division. ***eLife*** 5:e10767 (*co-first author)

[6] (Review) Yu, Y., You, L., **Liu, D.,** Hollinshead, W., Tang, Y.J., and Zhang, F. (2013). Development of Synechocystis sp. PCC 6803 as a phototrophic cell factory. ***Marine drugs*** 11, 2894-2916.

Sourcebook Chapter

[1] ***The Chlamydomonas Sourcebook*, 3rd Edition** 2022, **Elsevier**
Volumes 1 - Introduction to Chlamydomonas and Its Laboratory Use
Chapter 6 - Cell Cyle and Circadian Rhythm
James Umen and **Dianyi Liu**

Published Translations of Books

[1] ***Happier at Home*, Chinese Edition** 《幸福断舍离》 July 2018, **CITIC Publishing Group** 中信出版集团
ISBN-9787508685977

The book is a mandarin Chinese Edition translated by me from Gretchen Rubin's *New York Times* best-seller *Happier at Home.*

[2] ***Ten Billion Tomorrows*, Chinese Edition** 《100 亿个明天》 Jun 2017, **CITIC Publishing Group** 中信出版集团
ISBN-9787508675886

The book is a mandarin Chinese Edition translated by me from Brian Clegg's science fiction *Ten Billion Tomorrows: How Science Fiction Technology Became Reality and Shapes the Future.*

PEER REVIEW EXPERIENCES

- **Independent Peer Review**: *Journal of Evolutionary Biology, PeerJ*
- **Facilitated Peer Review**: *Science, The Plant Cell, Plos Genetics, Proceedings of the National Academy of Sciences*

SELECTED CONFERENCE PRESENTATIONS & AWARDS

2021 American Society for Cell Biology **(ASCB)** and European Molecular Biology Organization **(EMBO)** 2021.6
Workshop on Cell Size and Growth Regulation

★ **Speaker** by the ASCB/EMBO Workshop Program Committee (talk [1])

[1] Talk: **Liu, D.,** Vargas-García, C., Singh, A., and Umen, J.G. Elucidating the mitotic sizer in the multiple fission alga *Chlamydomonas reinhardtii*

The 2020 joint meeting of the American Society for Cell Biology (**ASCB**) **and** European Molecular Biology Organization (**EMBO**) vitual meeting 2020.12

[2] Poster and video presentation: **Liu, D**., Lopez-Paz, C., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway

[3] Poster and video presentation: **Liu, D.**, Vargas-García, C., Singh, A., and Umen, J. G. Elucidating the mitotic sizer in the multiple fission alga *Chlamydomonas reinhardtii*

The Plant Cell Atlas, Carnegie Institution for Science, Stanford, CA 2020.5

★ **Travel Award** by the **Plant Cell Atlas** for the in-person workshops
★ **Scribe** for all the virtual sessions
★ **Consortium Author** for the report of the 1st Plant Cell Atlas Workshop

The 2019 joint meeting of the American Society for Cell Biology (**ASCB**) **and** European Molecular Biology Organization (**EMBO**), Washington DC 2019.12

★ Participant of **Green Fluorescent Protein Image and Video Contest** - "Hatchlings," fearturing the whole *in vivo* hatching process of *Chlamydomonas reinhardtii* by a ZEISS Elyra 7 with Apotome super-resolution microscopy in 3D Leap-Mode.

[4] Poster: **Liu, D**., Lopez-Paz, C., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway

[5] Poster: **Liu, D.**, Vargas-García, C., Singh, A., and Umen, J. G. Modeling stochastic behavior of size control in the multiple fission cell cycle of Chlamydomonas

ASPB (American Society of Plant Biologists) **Plant Biology 2019**, San Jose, CA 2019.8

★ **ASPB Travel Grant** by **ASPB Plant Biology 2019**
★ **Concurrent Symposium Speaker** by the ASPB Program Committee (talk [6])

[6] Talk: **Liu, D**., Lopez-Paz, C., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway
[7] Poster: **Liu, D.** and Umen, J.G. Testing the constancy of the nuclear: cell volume ratio in wild type and cell-size mutants of Chlamydomonas.
[8] Poster: **Liu, D.** and Umen, J.G. Stochastic hybrid system approach to elucidate a cellular counting and sizing mechanism in Chlamydomonas.
[9] Poster: **Liu, D**., Lopez-Paz, C., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway

The 18th Int'l Conference on the Cell and Molecular Biology of Chlamydomonas, Washington DC 2018.6
★ **Travel Award** by the Committee for Scientific Training and Mentoring at the Danforth Plant Science Center
[10] Poster: **Liu, D**., Lopez-Paz, C., Geng, S., and Umen, J.G. Identification of Chlamydomonas reinhardtii endogenous genic flanking sequences for improved transgene expression.
[11] Poster: **Liu, D**., Lopez-Paz, C., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway

2018 Danforth Plant Science Center Annual Retreat, Potosi, MO 2018.5
★ **Best Talk Award** by the Danforth Plant Science Center Retreat Committee (talk [12])
[12] Talk: **Liu, D**., Lopez-Paz, C., and Umen, J.G. A heterogeneous nuclear ribonucleoprotein (hnRNP)-like protein in Chlamydomonas functions as a cell-cycle repressor in the retinoblastoma cell-size control pathway

T**he 4th Int'l Volvox Conference**, St. Louis, MO 2017.8
★ Designed the conference logo and giveaways
★ Volunteered at the registration desk

The 17th Int'l Conference on the Cell and Molecular Biology of Chlamydomonas, Kyoto, Japan 2016.6
★ **Travel Award** by the Committee for Scientific Training and Mentoring at the Danforth Plant Science Center
★ **Best Poster Award** by the 17th Int'l Conference on the Cell and Molecular Biology of Chlamydomonas (poster [14]).
[13] Poster: **Liu, D**., Li, Y., Lopez-Paz, C., Olson, B.J., and Umen, J.G. A new class of cyclin dependent kinase in Chlamydomonas is required for coupling cell size to cell division.
[14] Poster: **Liu, D**.and Umen, J.G. Testing the constancy of the nuclear : cell volume ratio in wild type and cell-size mutants of Chlamydomonas.

2016 Danforth Plant Science Center Annual Retreat, Grafton, IL 2016.5
★ **Best Talk Award** by the Danforth Plant Science Center Retreat Committee (talk [15]).
[15] Talk: **Liu, D**., Li, Y., Lopez-Paz, C., Olson, B.J., and Umen, J.G. A new class of cyclin dependent kinase in Chlamydomonas is required for coupling cell size to cell division.
[16] Poster: **Liu, D**., Li, Y., Lopez-Paz, C., Olson, B.J., and Umen, J.G. A new class of cyclin dependent kinase in Chlamydomonas is required for coupling cell size to cell division.

The 16th Int'l Conference on the Cell and Molecular Biology of Chlamydomonas, Pacific Groves, CA 2014.6
★ **Travel Award** by the **Genetics Society of America**
[17] Poster: **Liu, D**., Li, Y., Lopez-Paz, C., Olson, B.J., and Umen, J.G. A new class of cyclin dependent kinase in Chlamydomonas is required for coupling cell size to cell division.

INVITED TALKS AND WORKSHOPS

Chinese University of Hong Kong (Hong Kong), hosted by Dr. XiaoHong ZHUANG 2019. 11
- **Talk:** The conserved retinoblastoma tumor suppressor pathway controls cell size in Chlamydomonas
- **Workshop:** An introduction of the Volvocine algae family, from the evolution of the multicellularity to the multiple fission cell cycle
- **Hands-on in lab:** Immunofluorescence microscopy to detect protein of interest in Chlamydomonas.

Westlake University (Zhejiang, China), hosted by Dr. XiaoBo LI 2019.11
- **Talk:** The conserved retinoblastoma tumor suppressor pathway controls cell size in Chlamydomonas

- **Hands-on in lab:** [1] Protein extraction and co-immunoprecipitation in Chlamydomonas. [2] Sexual mating in Chlamydomonas.

INTERNSHIPS

Bayer CropScience LLC, Chesterfield. MO. Summer 2022

Chinese Academy of Agricultural Sciences, Beijing, China Summer 2011
- Analyzed the transcriptome of an anti-freeze protein in tobacco *Nicotiana benthamiana.*

National Institute of Metrology, Beijing, China Summer 2010
- (Analytical Chemistry Department) Operated liquid chromatography-mass spectrometry.

EDUCATION AND OUTREACH ACTIVITIES

California College of the Arts, CA 2022.2
FASHN-3200-2- **Investigative Studio: Biodesign**
- **Guest lecturer** for undergraduate art-major students

Designed and presented "Why do we care about algae?" explaining (1) algae hunting, (2) algae culturing, (3) algae in daily lives, and (4) general algae research topics.

The Institute for School Partnership at **Washington University in St. Louis**, MO 2020.7
Educ.6008.51 - **Teaching the Process of Scientific Investigation**
- **Guest lecturer** on a virtual panel for K-8 science teachers.
- Designed and presented "**Efficient Interpretation of Science,**" explaining (1) designing STEM projects for students, (2) introducing science to a general audience, and (3) broadcasting science outside of academic settings.

South City Academy STEAM Night, Confluence Charter Schools, MO 2020.2
- Designed and led the project "**Science in Plants.**"
- **Representative** of the Danforth Plant Science Center Booth.
- Taught pre-K to 8th grades (~ 840 students) about (1) differences between plants and animals, (2) photosynthesis and C3, C4, and CAM plants.

DDPSC Students Field Trips for **Ladue Horton Watkins High School**, Ladue School District, MO 2019.12
- Led project "**Discover Volvox Development**."
- Taught 10th grade from (8 sessions, ~60 students) about evolution and germ-somatic cell differentiation by characterizing wild type and developmental mutants of Volvox under dissecting microscope.

STEM DAY at **Meadows Elementary**, Riverview Gardens School District, MO 2019.3
- Led project "**Strawberry DNA Extraction.**"
- Taught 5th grade (7 sessions, ~100 students) about DNA by isolating DNA from frozen strawberries using soap, salt, and isopropyl-alcohol.

Raspberry Pi Jam at **Danforth Plant Science Center** 2019.1
- Volunteered at the **Snap Circuit** booth.

STEM DAY at **Marvin Elementary School**, Ritenour School District, MO 2018.5
- Led project "**Ice Tray Battery.**"
- Taught 1st grade (7 sessions, ~80 students) about electric circuit by lighting LED lights using ice tray, copper wire, steel nails, and cooking vinegar.

STEM DAY at **Jury Elementary School**, Hazelwood School District, MO 2018.3

- Led project "**Rainbow in a Jar.**"
- Taught pre-K (8 sessions, ~80 students) about density by making a rainbow cocktail in a glass jar using soap, water, cooking oil, and colored isopropyl-alcohol.

Raspberry Pi Jam at **Danforth Plant Science Center** 2018.1

- Volunteered at the **Soldering** booth.

CAREER DEVELOPMENT ACTIVITIES

- **Mentor** of 1st year rotation PhD student at Washington University — Spring 2022, Spring 2019
- Member of the **American Society for Cell Biology (ASCB)** — 2019.7-present
- **THREE MINUTE THESIS (3MT®) Workshop.** Donald Danforth Plant Science Center. — 2019.7
  - ★ **Final round competitor** in science communication event titled "**Science Impacting Society: Lightning Talks**" for a broad public audience of 100+
- Member of the **American Society of Plant Biologists (ASPB)** — 2019.1-present
- **Teaching Assistant** of **BIOL2013 Genetics laboratory**, University of Missouri, St. Louis — Spring 2018
- Attendee of **Confocal Microscopy Workshop**. Donald Danforth Plant Science Center. — Spring 2014
- **Teaching Assistant** of **BIO320 Genetics**, Stony Brook University — Spring 2012
- Member of **Undergraduate Biochemistry Society**, Stony Brook University — 2010.10 – 2012.5

CONTRACTING WORK AND SIDE PROJECTS

- Contractor at Pop Science official account ***Principia1687* 原理** — 2021.1-2021.12
  - **Writer/Editor/Proposal Designer.**
  - Participated in **10+ pop science articles.**
  - Received **200K+ combined views** on WeChat.
- **English Subtitle Translator** for documentaries by **Director Ryo Takeuchi 竹内亮** — 2020.6-present
  - Translated dialogues and voice-over originally in Chinese or Japanese into English.
  - Participated in **5+ documentaries** including *Long Time No See, Wuhan* (2020), *Beyond the Mountain* (2021), and *Two-Sided the Olympics: TOKYO 2020 DIARY* (2021).
  - Received **10M+ combined views** on YouTube.

OTHER RESPONSIBILITIES AND ACTIVITIES

- Staff lecturer at **St. Louis Modern Chinese School** — 2021.6 – present
  - Designed syllabus and taught Chinese-as-the-Second-Language to adult English-speakers. — 2022 Fall
  - Substitute teacher for 7th grade Chinese. — 2022 Spring
  - Primary teacher at 2021 Chinese Cultural Immersion Youth Summer Camp by Associations of Chinese-Americans. **Teacher representative/Speaker** at the world-wide online graduation ceremony. — 2021 Summer
- Member of **Japan America Society Women's Association of St. Louis** (JASWA). — 2018.12-present
  - **Board Member.** — 2019.12-present
  - **Communication Coordinator** to set up Zoom meetings and arrange/organize venues. — 2022.1-present
  - **Editor** of the bi-monthly English-Japanese bi-lingual JASWA newsletter. — 2019.10-2021.12
  - **Editor** of the annual JASWA directory. — 2019.10-2021.12
  - **Hospitality Assistant.** Sent crafts, hand-made cards, and flowers to members. — 2019.10-2020.3

- ❖ Member of Japanese Traditional Dance Group Tohzan-ryu (**日本舞踊 - 東山流**) 2019.9-present
  - Solo stage performance O-getsu-sama (**お月様**) at the Japanese Festival in St. Louis
- ❖ Member of **St. Louis Bon Odori Group** (**盆踊り**) 2017.5-present
  - Performed at the St. Louis Japanese Festival for four years
  - Performed at cultural events at Lindenwold University and Maryville University
- ❖ Completion of a **Half Marathon**. Go! St. Louis 2018 2018.4
- ❖ **Certificate of Completion in Bartending/Mixology**, the Bartending Institute of St. Louis 2017.6
- ❖ **Official Volunteer** for road guidance at **2008 Beijing Summer Olympic Games** 2008.8