

Fangwei Si

Department of Physics
Carnegie Mellon University
5000 Forbes Avenue, Wean Hall 6409, Pittsburgh PA, 15213
Email: fsi@cmu.edu

Research Experience

2022.06 - present	Assistant Professor, Department of Physics, Carnegie Mellon University,
2020.09 - 2022.05	Postdoctoral Researcher, Department of Integrative Structural and Computational Biology, The Scripps Research Institute, Supervisor: Dr. Lisa Racki,
2015.09 - 2022.05	Postdoctoral Researcher, Department of Physics and Section of Molecular Biology, University of California, San Diego, Supervisor: Dr. Suckjoon Jun,
2009.09 - 2015.08	Graduate Research Assistant, Department of Mechanical Engineering, Johns Hopkins University, Supervisor: Dr. Sean Sun, Co-supervisor: Dr. Denis Wirtz,
2007.05 - 2009.07	Undergraduate Research Assistant, Department of Theoretical and Applied Mechanics, Peking University, Supervisors: Dr. Jianxiang Wang & Dr. Huiling Duan,

Education

2009.09 - 2015.08	Ph.D. , Department of Mechanical Engineering, Johns Hopkins University
2005.09 - 2009.07	B.S. , Department of Theoretical and Applied Mechanics, Peking University

Publications

Postdoctoral Research at UC San Diego

1. Guillaume Le Treut, **Fangwei Si**, Dongyang Li, & Suckjoon Jun.
"Quantitative examination of five stochastic cell-cycle and cell-size control models for *Escherichia coli* and *Bacillus subtilis*."
Frontiers in Microbiology, doi:10.3389/fmicb.2021.721899 (2021). [PDF](#)
2. **Fangwei Si**^{*}, Guillaume Le Treut^{*}, John T. Sauls, Stephen Vadia, Petra Anne Levin, & Suckjoon Jun.
"Mechanistic origin of cell-size control and homeostasis in bacteria."
Current Biology, 29(11), 1760-1770.e7 (2019).
[PDF](#) [Video Abstract](#) [UCSD News](#) [phys.org](#) [ScienceDaily](#) [Mindzilla](#)
3. Suckjoon Jun, **Fangwei Si**, Rami Pugatch, & Matthew Scott.
"Fundamental principles in bacterial physiology – history, recent progress, and the future with focus on cell size control: a review."
Reports on Progress in Physics, 81(5), 056601 (2018). [PDF](#)
4. **Fangwei Si**^{*}, Dongyang Li^{*}, Sarah E. Cox, John T. Sauls, Omid Azizi, Cindy Sou, Amy B. Schwartz, Michael J. Erickstad, Yonggyn Jun, Xintian Li, & Suckjoon Jun.
"Invariance of initiation mass and predictability of cell size in *Escherichia coli*."
Current Biology, 27(9), 1278-1287 (2017).
[PDF](#) [Commentary](#) [UCSD News](#) [phys.org](#) [ScienceDaily](#)

Doctoral Research at Johns Hopkins University

5. Lijuan He, Jiaxiang Tao, Debonil Maity, **Fangwei Si**, Yi Wu, Tiffany Wu, Vishnu Prasath, Denis Wirtz, & Sean X. Sun.
"Role of membrane-tension gated Ca²⁺ flux in cell mechanosensation."
Journal of Cell Science, 131(4), jcs208470 (2018). [PDF](#)
6. Nash D. Rochman, **Fangwei Si**, & Sean X. Sun.
"To grow is not enough: impact of noise on cell environmental response and fitness."
Integrative Biology, 8(10), 1030-1039 (2016).
7. Dong-Hwee Kim, Bo Li, **Fangwei Si**, Jude M. Phillip, Denis Wirtz, & Sean X. Sun.
"Volume regulation and shape bifurcation in the cell nucleus."
Journal of Cell Science, 128(18), 3375-85 (2015). [PDF](#)
8. **Fangwei Si***, Bo Li*, William Margolin, & Sean X. Sun.
"Bacterial growth and form under mechanical compression."
Scientific Reports, 5, 11367; DOI: 10.1038/srep11367 (2015). [PDF](#)
9. **Fangwei Si**, Kimberly Busiek, William Margolin, & Sean X. Sun.
"Organization of FtsZ filaments in the bacterial division ring measured from polarized fluorescence microscopy."
Biophysical Journal, 105(9), 1976-1986 (2013). [PDF](#)
10. Hongyuan Jiang, **Fangwei Si**, William Margolin, & Sean X. Sun.
"Mechanical control of bacterial cell shape."
Biophysical Journal, 101(2), 327-335 (2011). [PDF](#)

Undergraduate Research at Peking University

11. Kai Zhang, **Fangwei Si**, Huiling Duan, & Jianxiang Wang.
"Microstructures and mechanical properties of silks of silkworm and honeybee."
Acta Biomaterialia, 6(6), 2165-2171 (2010).

Preprints

12. Guillaume Le Treut*, **Fangwei Si***, Dongyang Li, & Suckjoon Jun.
"Single-cell data and correlation analysis support the independent double adder model in both *Escherichia coli* and *Bacillus subtilis*."
bioRxiv, doi: <https://doi.org/10.1101/2020.10.06.315820> (2020). [PDF](#)
13. Guillaume Le Treut*, **Fangwei Si***, Dongyang Li, & Suckjoon Jun.
"Comment on 'Initiation of chromosome replication controls both division and replication cycles in *E. coli* through a double-adder mechanism'."
bioRxiv, doi: <https://doi.org/10.1101/2020.05.08.084376> (2020). [PDF](#)
14. John T. Sauls, Jeremy W. Schroeder, Steven D. Brown, Guillaume Le Treut, **Fangwei Si**, Dongyang Li, Jue D. Wang, & Suckjoon Jun.
"Mother machine image analysis with MM3."
bioRxiv, doi: <https://doi.org/10.1101/810036> (2019). [PDF](#)

*co-first author

see a complete list of publications in Google Scholar.

Invited Talks & Presentations

Invited Talks & Oral Presentations

2020.03	APS 2020 March Meeting (via DBIO Virtual Meeting).
2020.02	The Biophysical Society 2020 Annual Meeting, Physical Cell Biology Subgroup, San Diego, CA.
2019.11	San Diego Microbiology Group Seminar Series, San Diego, CA.
2019.09	Inaugural Integrative Biology Symposium of the Salk Institute, San Diego, CA.
2019.08	Molecular Genetics of Bacteria and Phages Meeting, Madison, WI.
2019.07	20th International Conference on Bacilli and Gram-Positive Bacteria, College Park, MD.
2017.02	Physics Colloquium, California State University, North Ridge, CA.
2016.12	West Coast Bacterial Physiologists Annual Asilomar Conference, Asilomar, CA.
2016.10	UCSD Friends of Cells Data Club, San Diego, CA.
2016.09	UCSD Division of Biological Sciences-Salk Institute Annual Retreat, Lake Arrowhead, CA.

Poster Presentations

2020.10	BMES 2020 Virtual Annual Meeting.
2018.12	ASCB EMBO 2018 Annual Meeting, San Diego, CA.
2016.06	Gordon Research Conference on Bacterial Cell Surfaces, West Dover, VT.
2015.02	59th Annual Meeting of Biophysical Society, Baltimore, MD.
2011.02	55th Annual Meeting of Biophysical Society, Baltimore, MD.

Awards & Fellowships

2015.09	Nominee for Chinese Government Award for Outstanding Self-financed Students Abroad, China Scholarship Council.
2009.09	Departmental fellowship by Johns Hopkins University Mechanical Engineering.
2008.06	Dean's Award by Peking University for Academic Excellence.
2008.06	Tung OOCL Scholarship by Peking University and Hong Kong Tung Foundation.
2006.06	Dean's Award by Peking University for Social Work Excellence.

Teaching & Mentoring Experience

Teaching Experience

2014 Spring	Teaching assistant of ME.530.441 - <i>Introduction to Biophotonics</i> , Department of Mechanical Engineering, Johns Hopkins University
2013 Fall	Teaching assistant of ME.530.231 - <i>Thermodynamics</i> , Department of Mechanical Engineering, Johns Hopkins University

Mentored Students & Projects

2013.05 - 2013.8	Vallery Salomon, exchange undergraduate student, Morgan State University, <i>FRET microscopy of Z-ring constriction during bacterial cell division.</i>
2012.05 - 2012.8	Tyrene Hubbard, exchange undergraduate student, University of Arizona, <i>Microfabrication for studying the growth of single bacterial cells.</i>
2012.02 - 2012.8	Vinay Jyothi, sophomore in Mechanical Engineering, Johns Hopkins University, <i>Investigating the growth of the spheroplast form of bacteria.</i>
2011.07 - 2013.5	Yoshitaka Sei, sophomore to senior in Mechanical Engineering, Johns Hopkins University <i>Quantifying defects in the bacterial cell wall during cell growth.</i>
2010.06 - 2010.08	Stephen Lee, sophomore in Mechanical Engineering, Johns Hopkins University <i>Developing biochemical assays to perturb bacterial morphogenesis.</i>

References

Lisa Racki, Ph.D.

Assistant Professor of Integrative Structural and Computational Biology
The Scripps Research Institute
10550 N Torrey Pines
MB-205
La Jolla, California 92037
Email: lracki@scripps.edu
Phone: +1 (858)784-2674

Suckjoon Jun, Ph.D.

Associate Professor of Physics and Molecular Biology
University of California, San Diego
9500 Gilman Drive
Urey Hall 6250
La Jolla, California 92093
Email: jun@ucsd.edu
Phone: +1 (858)534-2384

Sean X. Sun, Ph.D.

Professor of Mechanical Engineering and Biomedical Engineering
Johns Hopkins University
3400 North Charles Street
Shaffer Hall 204
Baltimore, Maryland 21218-2682
Email: ssun@jhu.edu
Phone: +1 (410)516-4003

Petra Anne Levin, Ph.D.

Professor of Biology
Co-director, Plant and Microbial Biosciences Graduate Program
Washington University in St. Louis
CB 1137
One Brookings Drive
St. Louis, Missouri 63130-4899
Email: plevin@wustl.edu
Phone: +1 (314)935-7888

Denis Wirtz, Ph.D.

Vice Provost for Research
Theophilus H. Smoot Professor in Engineering Science, Chemical and Biomolecular Engineering, Oncology and Pathology
Johns Hopkins University
3400 North Charles Street
Croft Hall 116
Baltimore, Maryland 21218
Email: wirtz@jhu.edu
Phone: +1 (410)516-8094