

Suckjoon Jun

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EDUCATION

Ph.D., Theoretical Physics Simon Fraser University, Vancouver, Canada Thesis: Kinetic model of DNA replication & the looping of semiflexible polymers	1999-2004
M.Sc., Theoretical Condensed Matter Physics Iowa State University and Ames Laboratory, Ames, IA, USA Thesis: Heisenberg model for 3 spin-1/2 ions & comparison with susceptibility measurements	1997-1999
B.Sc., Physics, Busan National University, Busan, Korea	1993-1997

APPOINTMENT & AFFILIATIONS

Assistant Professor, Physics and Molecular Biology, UC San Diego BioCircuit Institute, Molecular Biophysics Training Program, Bioinformatics/Systems Biology	10/2012- present
Bauer Fellow (junior PI) at the FAS Center for Systems Biology, Harvard University Head: Andrew Murray	09/2007-08/2012
Post-doc (with Francois Taddei) Miro Radman lab (Necker Hospital), Paris, France	10/2006-08/2007
Post-doc (with Bela Mulder) FOM-institute AMOLF, Amsterdam, The Netherlands	09/2004-09/2006
Visiting scholar (invited by Micha Gromov) Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France (invited by Bae-Yeun Ha) University of Waterloo, Canada (invited by Aaron Bensimon) Pasteur Institute, Paris, France	09/2006 2004/2006/2007 01/2000-06/2000

HONORS AND AWARDS

Scialog Fellow by Research Corporation / Grodon and Betty Moore Foundation	2015-2016
Allen Distinguished Investigator award (the Paul G. Allen Family Foundation)	2013
Pew Scholar award (the Pew Charitable Trusts)	2013
NSF CAREER award (National Science Foundation)	2013
Marie-Curie Incoming International Post-doctoral Fellowship (declined in favor of the Bauer Fellowship)	2007-2009 (declined)
NSERC (Canada) post-doctoral fellowship (40K/year)	2005-2007
The Dean of Graduate Studies Convocation Medal in the Faculty of Science Simon Fraser University (ranked 1 st in natural sciences)	2005
Runner Up for NSERC (Canada) Doctoral Prizes (top 4 in the natural sciences & engineering)	2005
Simon Fraser Univ. nominee for the Canadian Association of Graduate Studies Thesis Awards	2005

CURRENT EXTERNAL FUNDING (TOTAL DIRECT COST ~ \$3M)

\$1.6M	Allen Distinguished Investigator award	2013-2017
\$240K	Pew Scholar award	2013-2018
\$1.15M	NSF CAREER award	2013-2018

PAST FUNDING

\$1.38M	Bauer Fellowship, Harvard University and NIH P50	2007-2012
\$25K	NIH R01 subaward through Dr. Petra Levin's NIH R01 GM064671-07	08/2009-07/2010

PUBLICATIONS

IN PRESS

1. Sattar Taheri-Araghi, Serena Bradde, Norbert Hill, Petra A. Levin, Johan Paulsson, Massimo Vergassola*, **Suckjoon Jun***,
Cell size control and homeostasis in bacteria
Current Biology (in press)
2. Sattar Taheri-Araghi, Steven B. Brown, John T. Sauls, Dustin McIntosh, & **Suckjoon Jun**,
Single-cell physiology
Annual Review of Biophysics (in press)
3. Sattar Taheri and **Suckjoon Jun**,
Cell size control: structure and hierarchy of physiological control
Frontiers in Microbiology (in press)
4. **Suckjoon Jun**,
Chromosome, cell cycle, and entropy
Biophysical Journal (in press)

PEER-REVIEWED

5. **Suckjoon Jun** and Sattar Taheri-Araghi,
Cell-size maintenance: universal strategy revealed
Trends in Microbiology 23, 4-6 (2015)
6. Ariel Amir, Farinaz Babaeipour, Dustin McIntosh, David R. Nelson & **Suckjoon Jun**,
Bending forces plastically deform growing bacterial cell walls.
Proc. Nat. Acad. Sci. USA (2014)
[\[Nature Physics highlight\]](#)
7. Brenda Youngren, Henrik J. Nielsen, **Suckjoon Jun** & Stuart Austin,
The multi-fork Escherichia coli chromosome is a self-duplicating and self-segregating thermodynamic ring polymer.
Genes & Development. **28**, 71-84 (2014).
8. J. Pelletier, K. Harvorsen, B.-Y. Ha, R. Paparcone, S. Sandler, C. Woldringh, W. Wong* & **S. Jun***,
Physical manipulation of the Escherichia coli chromosome reveals its soft nature.
Proc. Nat. Acad. Sci. Plus, **109**(40), E2649-E2656 (2012).
[\[PNAS highlight\]](#) [\[Nature Methods highlight\]](#)
4. Y. Jung, J. Kim, **S. Jun**, B.-Y. Ha,
Intrachain Ordering and Segregation of Polymers under Confinement,
Macromolecules 45(7), 3256-3262 (2012).
5. Y. Jung, J. Kim, C. Jeon, H. Jeong, **S. Jun**, B.-Y. Ha,
Ring polymers as model bacterial chromosomes: confinement, chain topology, and how they interact.
Soft Matter 8, 2095-2102 (2012).
6. P. Wang, L. Robert, J. Pelletier, W. Dang, F. Taddei, A. Wright, **S. Jun***.
Robust growth of *Escherichia coli*.
Current Biology 20, 1099-1103 (2010).
[\[F1000\]](#) [\[Top 7 from F1000, The Scientist\]](#) [\[Top 7 biochemistry papers, The Scientist\]](#)
7. **Suckjoon Jun*** and Andrew Wright*.
Entropy as the driver of chromosome segregation,
Nature Reviews Microbiology 8, 600-607 (2010).
Note: this is a peer-reviewed article under "Opinions" section of the journal, containing major original results.

8. Youngkyun Jung, **Suckjoon Jun**, Bae-Yeun Ha.
A self-avoiding polymer trapped inside a cylindrical pore: Flory free energy and unexpected dynamics,
Phys. Rev. E 79, 061912 (2009).
9. **Suckjoon Jun**, D. Thirumalai and Bae-Yeun Ha.
Compression and stretching of a self-avoiding chain in cylindrical nanopores,
Phys. Rev. Lett. 101, 138101 (2008).
10. Axel Arnold, Behnaz Borzorgui, Daan Frenkel, Bae-Yeun Ha and **Suckjoon Jun**.
Unexpected relaxation dynamics of a self-avoiding polymer in cylindrical confinement,
J. Chem. Phys. 127, 164903 (2007).
11. Axel Arnold and **Suckjoon Jun**.
Timescale of entropic segregation of flexible polymers in confinement: Implications for chromosome segregation in filamentous bacteria,
Phys. Rev. E 76, 031901 (2007).
12. **Suckjoon Jun***, Axel Arnold and Bae-Yeun Ha.
Confined space and effective interactions of multiple self-avoiding chains,
Phys. Rev. Lett. 98, 128303 (2007).
13. **Suckjoon Jun*** and Bela Mulder.
Entropy-driven spatial organization of highly confined polymers: Lessons for the bacterial chromosome.
Proc. Nat. Acad. Sci. 103, 12388 (2006).
[\[Journal of Cell Biology highlight\]](#) [\[F1000\]](#)
14. **Suckjoon Jun** and John Bechhoefer.
Nucleation and growth in one dimension. part II: Application to DNA replication kinetics.
Phys. Rev. E 71, 011909 (2005).
15. **Suckjoon Jun**, Haiyang Zhang, and John Bechhoefer.
Nucleation and growth in one dimension. part I: The generalized Kolmogorov-Johnson-Mehl-Avrami model.
Phys. Rev. E 71, 011908 (2005).
16. **S. Jun**, Y. Hong, H. Imamura, B.-Y. Ha, J. Bechhoefer, and P. Chen.
Self-Assembly of the Ionic Peptide EAK16: the effect of charge distributions on self-assembly.
Biophysical Journal 87, 1249-1259 (2004).
17. **Suckjoon Jun**, John Herrick, Aaron Bensimon, and John Bechhoefer.
Persistence length of chromatin determines origin spacing in *Xenopus* early-embryo DNA replication: Quantitative comparisons between theory and experiment.
Cell Cycle 3(2), 223-229 (2004).
18. **Suckjoon Jun**, John Bechhoefer, and Bae-Yeun Ha.
Diffusion-limited loop formation of semiflexible polymers: Kramers theory and the intertwined time scales of chain relaxation and closing.
Europhys. Lett. 64(3), 420-426 (2003).
19. John Herrick, **Suckjoon Jun**, John Bechhoefer, and Aaron Bensimon.
Kinetic model of DNA replication in eucaryotic organisms.
J. Mol. Biol. 320, 741-750 (2002).
20. M Luban, F Borsa, S Budko, P Canfield, **S Jun**, JK Jung, P Kgler, D Mentrup, A Mller, R Modler, D Procissi, BJ Suh, and M Torikachvili.
Heisenberg spin-triangle in V6-type magnetic molecules: Experiment and theory.
Phys. Rev. B 66, 054407(1)-054407(12) (2002).

INVITED BOOK CHAPTERS, COMMENTARIES, AND MISCELLANEOUS

1. Sattar Taheri & **Suckjoon Jun**,
Single-cell cultivation in microfluidic devices,
the Handbook of Hydrocarbon and Lipid Microbiology (Springer, to appear in 2015)

2. **Suckjoon Jun**,
Polymer physics for understanding bacterial chromosomes.
Ch.6 in Bacterial Chromatin (edited by Dame and Dorman), Springer (2010).
3. **Suckjoon Jun** and Nick Rhind,
Just-in-time DNA replication,
Physics 1, 32 (2008).
4. **Suckjoon Jun** and John Bechhoefer.
Role of Polymer Loops in DNA replication.
Physics in Canada 59(2), pp. 85-92 (2003).
5. **Jun, S.**, Bechhoefer J., and Ha, B.-Y.
Ch. 3. Looping of Semiflexible Polymers: from Statics to Dynamics in Molecular Interfacial Phenomena of Polymers and Biopolymers, edited by Pu Chen (Woodhead Publishing Ltd, Cambridge, UK) (July, 2005).

INVITED TALKS (SINCE 2007)

- 06/2015 Gordon Research Conference on Chromosome Dynamics, NH
- 06/2015 BioComlex - Taiwan International Workshop on Soft Matter and Biological Physics, Taiwan
- 05/2015 Umea University, Sweden
- 04/2015 Duke University
- 04/2015 University of North Carolina, Chapel Hill
- 04/2015 Johns Hopkins University, USA
- 02/2015 Allen Distinguished Investigators Symposium, UCSD/Scripps Institute of Oceanography
- 12/2014 Mech-Bio seminar, Mechanical and Aerospace Department, UCSD
- 11/2014 UC Merced, Physics colloquium, USA
- 10/2014 (declined) Cold Spring Harbor Asia meeting on Quantitative Biology, Suzhou, China
- 10/2014 Bauer Forum, FAS Center for Systems Biology, Harvard University
- 10/2014 Dep. Systems Biology, Harvard Medical School
- 10/2014 Biophysics seminar, MIT
- 10/2014 "Phenotypic heterogeneity and sociobiology of bacterial populations," Bavaria, Germany
- 10/2014 AMOLF, Amsterdam, the Netherlands
- 08/2014 UKC meeting, San Francisco, CA, USA
- 07/2014 The Joint Annual Meeting of the Japanese Society for Mathematical Biology and the Society for Mathematical Biology at Osaka, Japan
- 07/2014 RIKEN, Wako, Japan
- 07/2014 The University of Tokyo, Tokyo, Japan
- 06/2014 UC Riverside, Dep. Biochemistry, CA, USA
- 10/2013 Allen Distinguished Investigators Symposium, Seattle, WA, USA
- 10/2013 Microbiology Dep., University of Washington, Seattle, WA, USA
- 08/2013 (declined) SPIE Optical Trapping & Optical Micromanipulation Conference, San Diego, CA, USA
- 08/2013 The Seventh Annual q-Bio Conference, Santa Fe, NM, USA
- 03/2013 Frontiers in Bioinformatics and Systems Biology Colloquium, UC San Diego, CA, USA
- 02/2013 Dep. Biochemistry and Center for Systems Biology, University of Oxford, Oxford, UK
- 02/2013 Institute for Computational Physics, University of Stuttgart, Germany
- 02/2013 (Keynote) DECHEMA workshop Microfluidics for Systems Biology and Bioprocess Development, Frankfurt, Germany
- 02/2013 Dep. Physics, Simon Fraser University, Vancouver, Canada
- 11/2012 San Diego Microbiology Group (SDMG), San Diego, CA, USA
- 11/2012 The Canadian Institute for Advanced Research (CIFAR), Toronto, Canada
- 10/2012 Physics Dep., University of Pennsylvania, Philadelphia, PA, USA
- 06/2012 The Biology and Physics of Bacterial Genome Organization workshop, Leiden, the Netherlands
- 06/2012 Mathematics Dep., Imperial College, London, UK
- 05/2012 Biology Dep., University of Massachusetts - Amherst, MA, USA
- 04/2012 (Keynote) Chemical Biophysics Symposium, University of Toronto, Canada

03/2012 Physics Dep., University of Illinois at Urbana Champaign, IL, USA
 03/2012 Physics Dep., University of Massachusetts - Amherst, MA, USA
 02/2012 Physics Dep., UC San Diego, CA, USA
 02/2012 Biology & Math, San Diego State University, CA, USA
 01/2012 Physics Dep., Rutgers University, NJ, USA
 01/2012 Physics Dep., University of Texas, Austin, TX, USA
 01/2012 Physics Dep., The Ohio State University, OH, USA
 01/2012 "Cells, Circuits, and Computation" symposium, Harvard University, MA
 09/2011 Physics Dep., New York University, New York, USA
 09/2011 Rockefeller University, New York, USA
 05/2011 IST Austria, Vienna, Austria
 05/2011 Squishy Physics seminar, Harvard University, MA, USA
 03/2011 Weizmann-Harvard meeting on Systems Biology, Weizmann Institute, Israel
 03/2011 Bioengineering Dep., Caltech, CA, USA
 03/2011 Microbial Science Initiative Chalk-talk, Harvard University, MA, USA
 02/2011 Physics Dep., MIT, MA, USA
 09/2010 Physics Dep., University of Toronto, Canada
 08/2009 EMBO meeting on prokaryotes, Oxford University, UK
 05/2009 Gordon Research Conference, Italy
 03/2009 Widely Applied Mathematics seminar, Harvard University, MA, USA
 09/2008 Site-Specific recombination meeting, Woods Hole, MA, USA
 07/2008 Physics Dep., Brandeis University, MA, USA
 04/2008 Physics Dep., MIT, MA, USA
 10/2007 daVinci group monthly lunch, Harvard University, MA, USA
 09/2007 Lewis-Sigler Center, Princeton University, NJ, USA
 08/2007 Physics Dep., Simon Fraser University, Canada
 05/2007 Pasteur Institute, Paris, France

TRAINING (SELECTED SUMMER/WINTER SCHOOLS)

Advanced Bacterial Genetics, Cold Spring Harbor Laboratory Course	Summer 2010
Jerusalem Winter School in Theoretical Physics	Winter 2005
Systems Biology (organized by Uri Alon, Naarma Barkai, Natalie Balaban)	
Les Houches Summer School Session LXXXII	Summer 2004
Multiple Aspects of DNA and RNA: from Biophysics to Bioinformatics	
Boulder Summer School on Nonequilibrium Statistical Physics	Summer 2001
Glasses, transport & friction, biological systems, and turbulence	

TEACHING

PHYS177/277, <i>Physics of the Cell</i> , a literature-based graduate course in quantitative, physical, and systems biology, UCSD	Spring 2013
Faculty for Life Sciences 100 course (experimental biology lab), Harvard University	Fall 2010
Foljuif (France) summerschool instructor for an interdisciplinary research	Summer 2006
Teaching assistant for various undergraduate physics courses	1997-2004

PROFESSIONAL ACTIVITIES

Reviewer for Nature, Nature Reviews Microbiology, Nature Methods, PNAS, Physical Review Letters, Physical Reviews, Physical Biology, Journal of Chemical Physics, PLoS ONE, PLoS Comp Biol, Current Biology, Journal of Microscopy, Biophysical Journal, Nucleic Acids Research, Integrative Biology, Molecular Systems Biology, Molecular Microbiology.

Reviewer for grants & awards: National Science Foundation (NSF) onsite panel, USA; Israeli Science Foundation, Israel; Foundation for Fundamental Research on Matter (FOM), the Netherlands; INRA, France; Helmholtz Association of German Research Centres, Germany

ACADEMIC SERVICES

Doctoral thesis committee: Min Ju Shon (Thesis Advisor: Adam Cohen, Chemistry Department, Harvard University, 2010-2012), John B. Deris (advisor Terry Hwa, Physics, UCSD, 2013-), Michael J. Erickstad (advisor Alex Groisman, Physics, UCSD, 2013-), Tony Hui (advisor Terry hwa, 2013-2014), Edward John Obrien (advisor Bern Paulson, Bioengineering, UCSD, 2013-), BIBS PhD oral exam committee for Jason Yao (advisor Roy Wollman, Chem/Biochem, 2013-), Nick Keller (advisor Doug Smith physics, 2013-)

UCSD service physics graduate admissions committee (2014-), physics exam committee (2012-2014), colloquium committee (2013-2014), qBio faculty search committee (2013-2014), ad hoc committee for the appointment for A.V. Balatsky (as an adjunct professor) (2014), Ethics Course panel (2013), UCSD qBio Education Program Executive Committee, UCSD qBio Education Program Web site committee

Guest lectures PHYS261 (2013, 2014), Pogliano/Elio courses (2013, 2015), etc

External thesis examiner for thesis defense of Ya Liu (advisor Bulbul Chakraborty, Brandeis University, 2009)

CURRENT COLLABORATORS

Bacterial growth, cell cycle, cell-size control: Susan Golden (UCSD), Terry Hwa (UCSD), Petra Levin (Washington Univ.), Sue Lovett (Brandeis), Anca Segall (SDSU), Massimo Vergassola (UCSD).

Chromosomes (bacteria and eukaryotes): Judith Armitage (Univ. Oxford), Stuart Austin (National Cancer Institute), Jean-Yves Bouet (CNRS - Univ. Toulouse III, Toulouse, France), Bae-Yeun Ha, (Univ. Waterloo, Canada), Kees Murre (UCSD), Conrad Woldringh (Univ. Amsterdam), Andrew Wright (Tufts Medical School)

Cell walls & morphology: Ariel Amir (Harvard Junior Fellow) and David Nelson (Harvard University)

CURRENT COMPOSITION OF RESEARCH GROUP

1 lab manager, 2 project scientists, 3 post-docs, 1 graduate student, 3 undergrads