

CURRICULUM VITAE

Date of Revision: June 21, 2017

Name: Jun Liu, Ph.D.

Position: Associate Professor with Tenure, Department of Microbial Pathogenesis

School: Yale University School of Medicine and the Graduate School

Education:

A.B. Sichuan University, Chengdu, China (Physics) 1992
M.S. Wuhan University, Wuhan, China (Physics) 1995
Ph.D. Chinese Academy of Sciences (Physics) 1998

Career/Academic Appointments:

1998-01 Postdoctoral Fellow in Biophysics, Institute of Molecular Biophysics, Florida State University, Tallahassee, FL

2001-06 Visiting Assistant in Research, Institute of Molecular Biophysics, Florida State University, Tallahassee, FL

2006-07 Staff Scientist, Laboratory of Cell Biology, National Cancer Institute, National Institutes of Health, Bethesda, MD

2007-14 Assistant Professor, Department of Pathology & Laboratory Medicine, The University of Texas Medical School at Houston, Houston, TX

2014-17 Associate Professor (tenured), Department of Pathology & Laboratory Medicine, The University of Texas Medical School at Houston, Houston, TX

2007-17 Faculty Member, Graduate School of Biomedical Sciences (GSBS), The University of Texas Health Science Center at Houston, Houston, TX

2010-17 Faculty member, The Program of Structural and Computational Biology and Molecular Biophysics, Baylor College of Medicine, Houston, TX

2008- Adjunct Professor, Department of Microbiology and Molecular Genetics, The University of Texas Medical School at Houston, Houston, TX

2017- Associate Professor with tenure, Department of Microbial Pathogenesis, Yale School of Medicine, New Haven, CT

Professional Honors & Recognition:

University

2016: McGovern Scholar Award, McGovern Medical School at UTHealth

Current Grants

Agency: NIH/NIAID
I.D.# R01 AI087946
Title: “Structure-function relationships in the spirochetal flagellar motor”
P.I.: Jun Liu, Ph.D.
Project period: 02/15/2010 – 05/31/2020

Agency: NIH/NIGMS
ID#: R01 GM110243

Title: “Structural basis of phage infection and DNA ejection”
P.I.: Jun Liu, Ph.D.
Project period: 05/01/2014 – 02/28/2018

Agency: NIH/NIGMS
ID#: R01 GM107629
Title: “Structural basis of signaling between bacterial chemoreceptors and flagella”
P.I.: Jun Liu, Ph.D.
Project period: 09/01/2014 – 08/31/2018

Agency: NIH/NIAID
I.D.# R01 AI123351
Title: “Assembly/function of the sorting platform of the *Shigella* type III secretion apparatus”
P.I.: William Picking, Ph.D.
Role on project: Co-investigator
Project period: 02/06/2016 – 01/31/2021

Agency: NIH/NIGMS
I.D.# R01 GM124378
Title: “Initiation of phage infection”
Role on project: Co-investigator
Project period: 09/01/2017 – 08/31/2021

Agency: Welch Foundation
ID#: AU-1714
Title: “High-resolution structure determination of molecular machines *in situ* by cryo electron tomography”
P.I.: Jun Liu, Ph.D.
Project period: 06/01/2009 – 05/31/2018

Agency: NIH/NIGMS
ID#: U24 GM116788
Title: “The southeastern consortium for microscopy of macromolecular machines”
Role on project: Co-PI
Project period: 07/18/2016 – 06/30/2021

Past Grants

Agency: NIH/OD
I.D.# S10 OD016279
Title: “Direct detector for a 300kV cryo-electron microscope”
Role on project: Co-PI
Project period: 07/01/2013 – 06/30/2014

Agency: NIH/NIAID
I.D.# R21 AI113014
Title: “Discovery and Characterization of Novel Flagellar Proteins in *Borrelia burgdorferi*”
P.I.: MD Motaleb, Ph.D.
Role on project: Co-Investigator

Project period: 02/01/2015 – 01/30/2017

Agency: NIH/NIAID

I.D.# R01 AI078958

Title: “Understanding unique aspects of motility and chemotaxis in *Borrelia burgdorferi*”

P.I.: Chunhao Li, M.D.

Role on project: Co-Investigator

Project period: 04/01/2015 – 03/30/2017

Agency: Welch Foundation

ID#: AU-1714

Title: “High-resolution structure determination of molecular machines *in situ* by cryo electron tomography”

P.I.: Jun Liu, Ph.D.

Project period: 06/01/2009 – 05/31/2018

Invited Speaking Engagements, Presentations, Symposia & Workshops Not Affiliated With Yale:

International/National

- 2017: International Workshop on Bacterial Flagella, Injectisomes and Type III Secretion Systems, Okinawa Institute of Science and Technology Graduate University (OIST), Okinawa, Japan: "In situ structural characterization of flagella and injectisomes by cryo-electron tomography"
- 2017: Seminar, Institute of Physics, Chinese Academy of Sciences, Beijing, China: “Visualizing molecular machines in action”
- 2016: Type III Secretion Meeting at Tübingen, Germany.
- 2016: Kuo Symposium on 3D Cryo-EM Molecular Imaging, Beijing, China: “Bacterial minicell: a versatile toolbox for in situ structural biology”
- 2016: Department Seminar, Department of Chemistry, Department of Molecular Physiology & Biological Physics, University of Virginia
- 2015: Department Seminar, Department of Microbiology and Immunology, East Carolina University
- 2015: Department Seminar, The 4th National Symposium of CryoEM and Structural Biology, Beijing, china
- 2015: Gordon Research Conference on Three Dimensional Electron Microscopy, New London, NH
- 2014: Spirochete Gordon Research Conference, Ventura, CA
- 2014: Keck Seminar, The Gulf Coast Consortia, Houston, TX
- 2014: Workshop: Single Protein Dynamics in Cellulo, The Okinawa Institute of Science and Technology, Japan
- 2014: Department Seminar, Department of Microbiology and Immunobiology, Harvard Medical School, Boston, MA
- 2014: The 2014 Kuo Symposium on 3D Cryo-EM Molecular Imaging, Shanghai, china
- 2014: Microscopy & Microanalysis 2014 Meeting, Hartford, CT
- 2014: Workshop: Single Protein Dynamics in Cellulo, The Okinawa Institute of Science and Technology, Japan
- 2014: Department Seminar, Department of Biochemistry, West Virginia University
- 2014: The 7th International Tomography Congress, Cancun, Mexico
- 2014: Department Seminar, Department of Biology, UT San Antonio
- 2013: Department Seminar, The FDA/NCTR Nanotechnology Core, Jefferson, AK, Department of Biochemistry, West Virginia University

- 2013: The 113th General Meeting of the American Society for Microbiology, Denver, CO
- 2013: Department Seminar, The Section of Molecular Genetics and Microbiology, UT Austin, Austin, TX
- 2012: Department Seminar, Department of Biochemistry and Molecular Biology, UTMB, Galveston, TX
- 2012: International Symposium of 3D Molecular Imaging by Cryo-Electron Microscopy, University of Science and Technology of China, Hefei, China
- 2012: Sensory Transduction in Microorganisms (STIM) Gordon Research Conference, Ventura, CA
- 2012: Department Seminar, Department of Molecular Virology and Microbiology, Baylor College of Medicine, Houston, TX
- 2010: Department Seminar, Department of Biology, Florida State University, Tallahassee, FL
- 2010: Third K. H. Kuo Summer School of Electron Microscopy and Crystallography, Institute of Biophysics, Beijing, China
- 2010: Sensory Transduction in Microorganisms (STIM) Gordon Research Conference, Ventura, CA
- 2010: Microscopy & Microanalysis 2010 Meeting, Portland, OR
- 2010: International Symposium: fifty Years of Biophysics Research at Nagoya University, Nagoya, Japan
- 2010: Japanese flagellar meeting 2010, Aichi, Japan
- 2009: Department Seminar, Microbiology and Molecular Genetics Department of The University of Texas Health Sciences Center at Houston, Houston, TX
- 2009: The 3rd Mechanobiology Workshop, National University of Singapore, Singapore
- 2009: Department Seminar, Department of Biology, Texas A&M University, College Station, TX
- 2009: Department Seminar, Burnham Institute for Medical Research, La Jolla, CA
- 2009: Department Seminar, Department of Biological Sciences, Purdue University, West Lafayette, IN
- 2008: Department Seminar, Institute of Biophysics, Chinese Academy of Sciences, Beijing, China
- 2008: First K. H. Kuo Summer School of Electron Microscopy and Crystallography, Tsinghua University, Beijing, China
- 2008: Department Seminar, Institute of Physics, Chinese Academy of Sciences, Beijing, China
- 2008: Department Seminar, Institute of Pathogen Biology, Chinese Academy of Medical Sciences, Beijing, China
- 2008: Department Seminar, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China
- 2007: Microscopy & Microanalysis 2007 Meeting, Fort Lauderdale, FL
- 2006: Department Seminar, National Heart & Lung Institute, Imperial College London, UK
- 2006: Department Seminar, Astbury Centre for Structural Molecular Biology, University of Leeds, UK
- 2006: Royal Microscopical Society Annual Cryo Microscopy Group Meeting, Birmingham, UK
- 2005: Department Seminar, Laboratory of Cell Biology, National Cancer Institute, National Institutes of Health, Bethesda, MD
- 2005: Gordon Research Conference on Three Dimensional Electron Microscopy, New London, NH

Regional

- 2011: UTMB Symposium on Structural Biology and Infectious Disease, Galveston, TX

Professional Service

Peer Review Groups/Grant Study Sections:

- 2010 Ad hoc Member, Enabling Bioanalytical & Imaging Technologies (EBIT), NIH

- 2016 Ad hoc Member, Macromolecular Structure and Function C Study Section, NIH
 2016 Ad hoc Member, Special emphasis panel (ZRG1 AARR-P)
 2016 Ad hoc Member, Bacterial Pathogenesis Study Section [BACP]

Journal Service:

Reviewer

2012-present Reviewer for Cell, Science, Nature, Nature Protocol, Nature Methods, Nature Microbiology, Nature Communication, Nature Review of Microbiology, Journal of Structural Biology, Journal of Molecular Biology, Molecular Microbiology, Journal of Visualized Experiments, Seminars in Cell and Developmental Biology, Virology, Structure, Biological Chemistry, PNAS, PloS One, Journal of Virology, Microorganisms, Journal of Microscopy, Journal of Cell Biology, Journal of Bacteriology

Bibliography:

Peer-Reviewed Original Research (with important papers highlighted)

1. Zou HM, **Liu J**, Ding DH, Wang RH, Froyen L, and Delaey L: Determination of interfacial residual stress field in an Al-Al₂O₃ composite using convergent-beam electron diffraction technique. *Ultramicroscopy* 1998 72:1-15.
2. **Liu J**, Li FH, Wan ZH, Fan HF, Wu XJ, Tamura T, and Tanabe K: Incommensurate modulated structure of "Pb"-1223 determined by combining high resolution electron microscopy and electron diffraction. *Materials Transactions JIM* 1998, 39:920-926
3. **Liu J**, Li FH, Wan ZH, Fan HF, Wu XJ, Tamura T, and Tanabe K: Electron crystallographic image-processing investigation and superstructure determination for (Pb_{0.5}Sr_{0.3}Cu_{0.2})Sr₂(Ca_{0.6}Sr_{0.4})-Cu₂O_y. *Acta Crystallogr A* 2001, 57:540-547.
4. **Liu J**, Wendt T, Taylor D, and Taylor KA: Refined model of the 10S conformation of smooth muscle myosin by cryo-electron microscopy 3D image reconstruction. *J Mol Biol* 2003, 329:963-972.
5. Zhu P, Chertova E, Bess J Jr, Lifson JD, Arthur LO, **Liu J**, Taylor KA, and Roux KH: Electron tomography analysis of envelope glycoprotein trimers on HIV and simian immunodeficiency virus virions. *Proc Natl Acad Sci U S A* 2003, 100:15812-15817.
6. **Liu J**, Reedy MC, Goldman YE, Franzini-Armstrong C, Sasaki H, Tregear RT, Lucaveche C, Winkler H, Baumann BA, Squire JM, Irving TC, Reedy MK, and Taylor KA: Electron tomography of fast frozen, stretched rigor fibers reveals elastic distortions in the myosin crossbridges. *J Struct Biol* 2004, 147:268-282.
7. **Liu J**, Taylor DW, and Taylor KA: A 3-D reconstruction of smooth muscle alpha-actinin by CryoEM reveals two different conformations at the actin-binding region. *J Mol Biol* 2004, 338:115-125.
8. Tama F, Feig M, **Liu J**, Brooks CL 3rd, and Taylor KA: The requirement for mechanical coupling between head and S2 domains in smooth muscle myosin ATPase regulation and its implications for dimeric motor function. *J Mol Biol* 2005, 345:837-854.
9. **Liu J**, Wu S, Reedy MC, Winkler H, Lucaveche C, Cheng Y, Reedy MK, and Taylor KA: Electron tomography of swollen rigor fibers of insect flight muscle reveals a short and variably angled S2 domain. *J Mol Biol* 2006, 362:844-860.
10. Zhu P, **Liu J**, Bess J Jr, Chertova E, Lifson JD, Grise H, Ofek GA, Taylor KA, and Roux KH: Distribution and three-dimensional structure of AIDS virus envelope spikes. *Nature* 2006, 441:847-852.
11. **Liu J**, Taylor DW, Kremontsova EB, Trybus KM, and Taylor KA: Three-dimensional structure of the myosin V inhibited state by cryoelectron tomography. *Nature* 2006, 442:208-211.

12. Bennett AE, **Liu J**, Van Ryk D, Bliss D, Arthos J, Henderson RM, and Subramaniam S: Cryo electron tomographic analysis of an HIV neutralizing protein and its complex with native viral gp120. *J Biol Chem* 2007, 282(38): 27754-27759.
13. **Liu J**, McBride MJ, and Subramaniam S: Cell-surface filaments of the gliding bacterium *Flavobacterium johnsoniae* revealed by cryo-electron tomography *J Bacteriol* 2007, 189: 7503-7506.
14. Dai W, Jia Q, Bortz E, Shah S, **Liu J**, Atanasov I, Li X, Taylor KA, Sun R, and Zhou ZH: Unique structures in a tumor herpesvirus revealed by cryo-electron tomography and microscopy. *J Struct Biol* 2008, 161:428-438.
15. Bartesaghi A, Sprechmann P, **Liu J**, Randall G, Sapiro G, and Subramaniam S: Classification and 3D averaging with missing wedge-correction in biological electron tomography. *J Struct Biol* 2008, 162(3):436-50.
16. Miao L, Vanderlinde O, **Liu J**, Grant R, Wouterse A, Philipse A, Stewart M, and Roberts TM: Filament packing constraints generate protrusive force in amoeboid cell motility. *Proc Natl Acad Sci U S A* 2008, 105:5390-5.
17. Ye F, **Liu J**, Winkler H, and Taylor KA: Integrin α IIb β 3 in a membrane environment remains the same height after Mn²⁺ Activation when observed by cryo-electron tomography. *J Mol Biol* 2008, 378:976-86.
18. **Liu J**, Bartesaghi A, Borgnia M, Sapiro G, and Subramaniam S: Structure of native HIV-1 gp120 trimers in unliganded and CD4-liganded states. *Nature* 2008, 455:109-113.
19. Hampton CM, **Liu J**, Taylor DW, DeRosier DJ, and Taylor KA: The 3D Structure of Villin as a Unique F-Actin Crosslinker. *Structure* 2008, 16(12):1882-91.
20. **Liu J**, Lin T, Botkin DJ, McCrum E, Winkler H, and Norris SJ: Intact Flagellar Motor of *Borrelia burgdorferi* Revealed by Cryo-Electron Tomography: Evidence for Stator Ring Curvature and Rotor/C Ring Assembly Flexion, *J Bacteriol* 2009, 191(16):5026-36.
21. Wu S, Liu J, Reedy MC, Winkler H, Reedy MK, and Taylor KA: Methods for identifying and averaging variable molecular conformations in tomograms of actively contracting insect flight muscle. *J Struct Biol* 2009, 168(3):485-502.
22. Sanabria H, Swulius MT, Kolodziej SJ, **Liu J**, and Waxham NM: CaMKII Regulates Actin Assembly and Structure, *J Biol Chem* 2009, 284(15):9770-80.
23. Winkler H, Zhu P, **Liu J**, Ye F, Roux KH, and Taylor KA: Tomographic subvolume alignment and subvolume classification applied to myosin V and SIV envelope spikes. *J Struct Biol* 2009, 165(2):64-77.
24. **Liu J**, Howell JK, Bradley SD, Zheng Y, Zhou ZH, and Norris SJ: Cellular architecture of *Treponema pallidum*: novel flagellum, periplasmic cone, and cell envelope as revealed by cryo electron tomography. *J Mol Biol* 2010, 403(4):546-61.
25. Wu S, **Liu J**, Reedy MC, Tregear RT, Winkler H, Franzini-Armstrong C, Sasaki H, Lucaveche C, Goldman YE, Reedy MK, and Taylor KA: Electron tomography of cryofixed, isometrically contracting insect flight muscle reveals novel actin-myosin interactions. *PLoS One* 2010, 5(9):e12643.
26. Fu X, Walter MH, Paredes A, Morais MC, and **Liu J**: The mechanism of DNA ejection in the *Bacillus anthracis* spore-binding phage δ a revealed by cryo-electron tomography. *Virology* 2011, 421(2):141-8.
27. Sze CW, Morado DR, **Liu J**, Charon NW, Xu H, and Li C: Carbon storage regulator A (CsrA(Bb)) is a repressor of *Borrelia burgdorferi* flagellin protein FlaB. *Mol Microbiol* 2011, 82(4):851-64.
28. **Liu J**, Chen CY, Shiomi D Niki, H and Margolin, W: Visualization of bacteriophage P1 infection by cryo-electron tomography of tiny *Escherichia coli*. *Virology* 2011, 417(2):304-11.

29. Luther PK, Winkler H, Taylor KA, Zoghbi ME, Craig R, Padrón R, Squire JM, and **Liu J**: Direct visualization of myosin-binding protein C bridging myosin and actin filaments in intact muscle. *Proc Natl Acad Sci U S A* 2011, 108(28):11423-8.
30. Motaleb MA, Pitzer JE, Sultan SZ, and **Liu J**: A novel gene inactivation system reveals altered periplasmic flagellar orientation in a *Borrelia burgdorferi* *fliL* mutant. *J Bacteriol* 2011, 193(13):3324-31.
31. Xu H, Raddi G, **Liu J**, Charon NW, and Li C: Chemoreceptors and flagellar motors are subterminally located in close proximity at the two cell poles in spirochetes. *J Bacteriol* 2011, 193(10):2652-6.
32. Zhang K, Tong BA, **Liu J**, and Li C: A single-domain FlgJ contributes to flagellar hook and filament formation in the Lyme disease spirochete *Borrelia burgdorferi*. *J Bacteriol* 2012, 194(4):866-74.
33. Zhang K, **Liu J**, Tu Y, Xu H, Charon NW, and Li C: Two CheW coupling proteins are essential in a chemosensory pathway of *Borrelia burgdorferi*. *Mol Microbiol* 2012, 85(4):782-94.
34. Wu S, **Liu J**, Reedy MC, Perz-Edwards RJ, Tregear RT, Winkler H, Franzini-Armstrong C, Sasaki H, Lucaveche C, Goldman YE, Reedy MK, and Taylor KA: Structural Changes in Isometrically Contracting Insect Flight Muscle Trapped following a Mechanical Perturbation. *PLoS One* 2012, 7(6):e39422.
35. Raddi G, Morado DR, Yan J, Haake DA, Yang XF, and **Liu J**: Three-dimensional structures of pathogenic and saprophytic *Leptospira* species revealed by cryo-electron tomography. *J Bacteriol* 2012, 194(6):1299-306.
36. Li C, Kurniyati, Hu B, Bian J, Sun J, Zhang W, **Liu J**, Pan Y, and Li C: Abrogation of neuraminidase reduces biofilm formation, capsule biosynthesis, and virulence of *Porphyromonas gingivalis*. *Infect Immun* 2012, 80(1):3-13.
37. **Liu J**, Hu B, Morado DR, Jani S, Manson MD, and Margolin W: Molecular architecture of chemoreceptor arrays revealed by cryoelectron tomography of *Escherichia coli* minicells. *Proc Natl Acad Sci U S A* 2012, 109(23):E1481-8.
38. Halford C, Gonzalez R, Campuzano S, Hu B, Babbitt JT, **Liu J**, Wang J, Churchill BM, and Haake DA: Rapid Antimicrobial Susceptibility Testing by Sensitive Detection of Precursor Ribosomal RNA Using a Novel Electrochemical Biosensing Platform. *Antimicrob Agents Chemother* 2013, 57(2):936-43.
39. Hu B, Margolin W, Molineux IJ, and **Liu J**: The Bacteriophage T7 Virion Undergoes Extensive Structural Remodeling during Infection. *Science* 2013, 339(6119):576-9.
40. Zhao X., Zhang K, Boquoi T, Hu B, Motaleb MA, Miller K, James M, Charon NW, Manson MD, Norris SJ, Li C, and **Liu J**: Cryo-Electron Tomography Reveals the Sequential Assembly of Bacterial Flagella in *Borrelia burgdorferi*. *Proc Natl Acad Sci U S A* 2013, 110(35):14390-5.
41. Chen L, Xu Q, Tu J, Ge Y, **Liu J**, and Liang FT: Increasing RpoS Expression Causes Cell Death in *Borrelia burgdorferi*. *PLoS One* 2013, 8(12):e83276.
42. Miller KA, Motaleb MA, **Liu J**, Hu B, Caimano MJ, Miller MR, and Charon NW: Initial Characterization of the FlgE Hook High Molecular Weight Complex of *Borrelia burgdorferi*. *PLoS One* 2014, 9(5):e98338.
43. Zhao X, Norris SJ, and **Liu J**: Molecular Architecture of Bacterial Flagellar Motor in Cells. *Biochemistry* 2014, 53(27):4323-33.
44. Dutta M, **Liu J**, Roux KH, and Taylor KA: Visualization of Retroviral Envelope Spikes in Complex with the V3 Loop Antibody 447-52D on Intact Viruses by Cryo-electron tomography. *J Virol* 2014, 88(21):12265-75.
45. Hu B, Morado DR, Margolin W, Rohde JR, Arizmendi O, Picking WL, Picking WD, and **Liu J**: Visualization of the type III secretion sorting platform of *Shigella flexneri*. *Proc Natl Acad Sci U S A* 2015, 112(4):1047-1052.

46. Lin T, Gao L, Zhao X, **Liu J**, and Norris SJ: Mutations in the *Borrelia burgdorferi* Flagellar Type III Secretion System Genes *fliH* and *fliI* Profoundly Affect Spirochete Flagellar Assembly, Morphology, Motility, Structure, and Cell Division. *MBio* 2015, 6(3). pii: e00579-15.
47. Sultan SZ, Sekar P, Zhao X, Manne A, **Liu J**, Wooten RM, and Motaleb MA: Motor Rotation Is Essential for the Formation of the Periplasmic Flagellar Ribbon, Cellular Morphology, and *Borrelia burgdorferi* Persistence within Ixodes scapularis Tick and Murine Hosts. *Infect Immun* 2015, 83(5):1765-77.
48. Hu B, Margolin W, Molineux IJ, and **Liu J**: Structural Remodeling of Bacteriophage T4 and Host Membranes During Infection Initiation. *Proc Natl Acad Sci U S A* 2015, 112(35):E4919-28.
49. Yan R, Edwards TJ, Pankratz LM, Kuhn RJ, Lanman JK, **Liu J**, and Jiang W: A Fast Cross-validation Method for Alignment of Electron Tomography Images Based on Beer-Lambert Law. *J Struct Biol* 2015, S1047-8477(15)30082-4.
50. Yan R, Edwards TJ, Pankratz LM, Kuhn RJ, Lanman JK, **Liu J**, and Jiang W: Simultaneous Determination of Sample Thickness, Tilt, and Electron Mean Free Path Using Tomographic Tilt Images Based on Beer-Lambert Law. *J Struct Biol* 2015, S1047-8477(15)30074-5.
51. Zhang K, **Liu J**, Charon NW, Li C: Hypothetical Protein BB0569 Is Essential for Chemotaxis of the Lyme Disease Spirochete *Borrelia burgdorferi*. *J Bacteriol* 2015, 198(4):664-72.
52. Morado DR, Hu B, **Liu J**: Using Tomoauto: A Protocol for High-throughput Automated Cryo-electron Tomography. *J Vis Exp* 2016, (107): e53608.
53. Yuan Z, Bai L, Sun J, Georgescu R, **Liu J**, O'Donnell ME, Li H: Structure of the Eukaryotic Replicative CMG Helicase Suggests a Pumpjack Motion for Translocation. *Nat Struct Mol Biol* 2016, 23(3):217-24.
54. Xu R, Zhang G, Mai J, Deng X, Segura-Ibarra V, Wu S, Shen J, Liu H, Hu Z, Chen L, Huang Y, Koay E, Huang Y, **Liu J**, Ensor JE, Blanco E, Liu X, Ferrari M, Shen H: An Injectable Nanoparticle Generator Enhances Delivery of Cancer Therapeutics. *Nat Biotechnol* 2016, 34(4):414-8.
55. Wunder EA, Figueira CP, Benaroudj N, Hu B, Tong BA, Trajtenberg F, **Liu J**, Reis MG, Charon NW, Buschiazio A, Picardeau M, Ko AI: A Novel Flagellar Sheath Protein, Fcpa, Determines Filament Coiling, Translational Motility And Virulence for the *Leptospira* spirochete. *Mol Microbiol* 2016, 101(3): 457-70.
56. Miller MR, Miller KA, Bian J, James ME, Zhang S, Lynch M, Callery PS, Hettick JM, Cockburn A, **Liu J**, Li C, Crane BR, Charon NW: Spirochaete flagella hook proteins self-catalyse a lysinoalanine covalent crosslink for motility. *Nature Microbiol*, 2016, 1(10):16134.
57. Moon KH, Zhao X, Manne A, Wang J, Yu Z, **Liu J**, Motaleb MA: Spirochetes flagellar collar protein FlbB has astounding effects in orientation of periplasmic flagella, bacterial shape, motility, and stability of motors in *Borrelia burgdorferi*. *Mol Microbiol*, 2016, 102(2):336-348.
58. Farley M, Tu J, Kearns DB, Molineux IJ, **Liu J**: Ultrastructural analysis of bacteriophage Φ 29 during infection of *Bacillus subtilis*. *J Struct Biol*, 2016, S1047-8477(16)30167-8.
59. Kurniyati K, Kelly JF, Vinogradov E, Robotham A, Tu Y, Wang J, **Liu J**, Logan SM, Li C: A novel glycan modifies the flagellar filament proteins of the oral bacterium *Treponema denticola*. *Mol Microbiol*, 2017, 103(1):67-85
60. Qin Z, Lin W, Zhu S, Franco AT, Liu J: Imaging the motility and chemotaxis machineries in *Helicobacter pylori* by cryo-electron tomography. *J Bacteriol* 2016, pii: JB.00695-16.
61. Hu B, Lara-Tejero M, Kong Q, Galán JE, **Liu J**: *In situ* molecular architecture of the *Salmonella* type III secretion machine. *Cell* 2017, 168(6):1065-1074.e10.
62. Tu J, Park T, Morado DR, Hughes KT, Molineux IJ, **Liu J**: Dual host specificity of phage SP6 is facilitated by tailspike rotation. *Virology* 2017, 507:206-215.
63. Krupka M, Rowlett VW, Morado DR, Vitrac H, Schoenemann K, **Liu J**, and Margolin W:

- Escherichia coli* FtsA forms lipid-bound minirings that antagonize lateral interactions between FtsZ protofilaments. *Nature Communications*, 2017 Jul 11;8:15957.
64. Hu G, **Liu J**, Roux KH, Taylor KA: Structure of Simian Immunodeficiency Virus Envelope Spikes bound with CD4 and Monoclonal Antibody 36D5. *J Virol*, in press.
65. Zhang W, Zheng W, Toh Y, Betancourt-Solis MA, Tu J, Fan Y, Vakharia VN, **Liu J**, McNew JA, Jin M, and Tao YJ: Crystal structure of an orthomyxovirus matrix protein reveals mechanisms for self-polymerization and membrane association, *Proc Natl Acad Sci U S A*, 2017 Aug 8;114(32):8550-8555.
66. Zhu S, Nishikino T, Hu B, Kojima S, Homma M, Liu J: Molecular architecture of the sheathed polar flagellum in *Vibrio alginolyticus*, *Proc Natl Acad Sci U S A*, in press.

Chapters, Books, and Reviews

67. **Liu J**, Wu XJ, Li FH, Wan ZH, Fan HF, Tamura T, and Tanabe K: Modulated Structure Determination of Pb-1212 and Pb-1223 by Electron Crystallographic Image Processing. In: *Electron Crystallography*. Edited by D. L. Dorset, Kluwer, Dordrecht, 1997.
68. Taylor KA, **Liu J**, Winkler H: Localization and Classification of Repetitive Structures in Electron Tomograms of Paracrystalline Assemblies. In: *Electron Tomography: Methods for Three-dimensional Visualization of Structures in the Cell*, Edited by J. Frank, Springer-Verlag, 2006.
69. Subramaniam S, Bartesaghi A, **Liu J**, Bennett AE, and Sougrat R: Electron Tomography of Viruses. *Curr Opin Struct Biol* 2007, 5:596-602.
70. Goldstein SF, Li, C., **Liu, J.**, Miller M, Motaleb, M., Norris, S.J., Silversmith, R.E., Wolgemuth, C.W., and Charon, N.W.: The Chic Motility and Chemotaxis of *Borrelia burgdorferi*. In: *Borrelia: Molecular and Cellular Biology*, Edited by D. Scott Samuels, Caister Academic Press, 2010.
71. **Liu J**, Wright ER, and Winkler H: 3D Visualization of HIV Virions by Cryoelectron Tomography. *Methods Enzymol* 2010, 483:267-90.
72. Charon NW, Cockburn A, Li C, **Liu J**, Miller KA, Miller MR, Motaleb MA, and Wolgemuth CW: The Unique Paradigm of Spirochete Motility and Chemotaxis. *Annu Rev Microbiol* 2012, 66:349-70.
73. Zhao X, Norris SJ, and **Liu J**: Molecular Architecture of Bacterial Flagellar Motor in Cells. *Biochemistry* 2014, 53(27):4323-33.
74. Prüß BM, **Liu J**, Higgs PI, and Thompson LK: Lessons in Fundamental Mechanisms and Diverse Adaptations from the 2015 Bacterial Locomotion and Signal Transduction Meeting. *J Bacteriol* 2015, 197(19):3028-40.
75. Motaleb MA, **Liu J**, Wooten RM: Spirochetal Motility and Chemotaxis in the Natural Enzootic Cycle and Development of Lyme disease, *Curr Opin Microbiol* 2015, 28:106-13.
76. Farley M, Hu B, Margolin W, **Liu J**: Minicells, Back in Fashion. *J Bacteriol* 2016, 198(8):1186-95.
77. Siegel SD, **Liu J**, Ton-That H: Biogenesis of the Gram-positive bacterial cell envelope. *Curr Opin Microbiol* 2016, 34:31-37.