

Anne E. Carpenter, Ph.D.

Imaging Platform Director, Broad Institute of Harvard and MIT
7 Cambridge Center, Cambridge, MA 02142
anne@broadinstitute.org (617) 714-7750
<http://broadinstitute.org/~anne>

Education

Whitehead Institute for Biomedical Research, at MIT, Cambridge, MA:
Postdoctoral fellowship completed in December 2006

University of Illinois, Urbana-Champaign, IL:
Ph.D. in Cell Biology completed in May 2003, GPA 4.0/4.0
Certificate in Business Administration for Life Scientists (non-credit)

Purdue University, West Lafayette, IN:
B.S. in Biological Sciences completed in May 1997, GPA 4.0/4.0

Major Honors and Fellowships

2012 Awarded NSF CAREER grant
2011 Named Young Leader of the French-American Foundation
2010 Awarded first NIH R01 grant (at age 35)
2009 Software project CellProfiler awarded Bio-IT World Best Practices Award
2008 Elected fellow of the Massachusetts Academy of Sciences
2008 Featured in PBS special, "Bold Visions: Women in Science & Technology"
2007 Named a "Rising young investigator" by Genome Technology magazine

Pre- and postdoctoral:

2004-2007 Life Sciences Research Foundation fellowship, Novartis
2006 For Women in Science fellowship, L'Oreal USA
2003-2004 Merck/MIT Computational & Systems Biology Initiative fellowship
2003 BioVision World Leader delegate
1998-2003 Howard Hughes Medical Institute predoctoral fellowship
1998 National Science Foundation fellowship, declined
1997 University of Illinois School and Department fellowships
1997 University of Illinois NIH training grant
1997 Phi Kappa Phi fellowship

Undergraduate:

1996 Howard Hughes Medical Institute undergraduate research fellowship
1995-1997 Purdue University School of Science scholar
1995 Pew Research scholarship, declined
1995 Merck Index Award in Organic Chemistry
1994 Presidential Scholar semifinalist
1994 National Merit Scholar

Research Grants

- 2012-2016 **NSF:** "CAREER: Image information extraction from heterogeneous populations of co-cultured cells". Role: Principal Investigator.
- 2012-2013 **NSF:** "RIG: Improving data quality and discovery tools in high-throughput microscopy". Role: Key Personnel. PI: Mark-Anthony Bray.
- 2012 **Eli Lilly:** "Extending the NIH's Assay Guidance Manual to High-Content Screening". Role: Principal Investigator.
- 2011-2015 **NIH:** "Automated image analysis for high-throughput phenotypic screening in *C. elegans*", R01 GM095672. Role: Key Personnel. PI: Carolina Wahlby.
- 2011-2014 **Gates Foundation:** "Establish an in vitro human liver platform that will aid drug discovery and vaccine development towards the eradication of malaria". Role: Key Personnel. PI: Sangeeta Bhatia.
- 2011-2013 **Harvard Stem Cell Institute:** "Identification of cellular signatures for schizophrenia in iPSC-derived neuronal cells". Role: Key Personnel. PI: Rakesh Karmacharya.
- 2010-2014 **NIH:** "Continued development of CellProfiler cell image analysis software", R01 GM089652. Role: Principal Investigator.
- 2010-2013 **Human Frontiers in Science Program:** "Cycle-Quant: Developing cell cycle profiles to classify responses and regulators". Role: collaborator with Rob Wolthuis and Young-Tae Chang.
- 2009-2011 **NIH:** "ImageJ as an extensible image processing framework", RC2-OD-09-004. Role: Principal Investigator of subcontract. PI: Kevin Eliceiri.
- 2009-2010 **NIH:** "Identifying novel anti-infectives by high throughput screening in whole animals", R01 A1085581-01. Role: Principal Investigator of subcontract. PI: Fred Ausubel.
- 2009 **Eli Lilly:** "Enabling Phenotypic Screens with Multiple Complex Cellular Morphologies". Role: Principal Investigator.
- 2008-2012 **NIH:** "Broad Institute Comprehensive Screening Center MLPCN", U54-HG005032-01. Role: Key Personnel. PI: Stuart Schreiber.
- 2008-2010 **AstraZeneca:** "Imaging data mining for determining small molecule mechanisms of action". Role: Principal Investigator.
- 2007-2012 **NIH:** "Genomics Based Drug Discovery", U54 RR024343-01. Role: Key Personnel. PI: Edward Scolnick.
- 2006 **Partnership for Cures:** "Testing for Drug Targets in Realistic Cell Environments", Biomedical Pilot Initiative. Role: Principal Investigator.
- 2004 **Society for Biomolecular Screening:** "Image analysis software for high-throughput cell-based assays", Small Grant Award. Role: Principal Investigator.

Research Experience

Imaging Platform Director, Broad Institute of Harvard and MIT, Cambridge MA. January 2007 - present. *Extracting rich information from biological images*. My group's current research focuses on extracting the richest information possible from biological images, particularly microscopy images from high-throughput experiments. To accomplish this, I direct a group of computer scientists and biologists to develop image analysis and data exploration methods and software that are open-source and freely available to the public (www.cellprofiler.org). We adapt these tools to address a variety of biological questions in the laboratories of collaborators in the Broad community and worldwide. We also use cell image data as a readout of cellular state in order to gain a systems-level view of cellular functions.

Postdoctoral research: Laboratory of David M. Sabatini at the Whitehead Institute for Biomedical Research, Cambridge MA. July 2003 – December 2006. *High-throughput microscopy, living cell microarrays and RNAi to reveal gene function*. My collaborator Thouis Jones and I designed and released the first open-source high-throughput cell image analysis software, CellProfiler (www.cellprofiler.org). I led a team of 5 researchers to developed advanced data mining methods to systematically examine the necessity of proteins for a variety of biological processes. We also collaborated with research laboratories worldwide on image analysis for high throughput screening.

Ph.D. thesis work: Laboratory of Andrew S. Belmont at the University of Illinois, Urbana-Champaign. August 1997 – June 2003. *Effects of transcriptional activators on large-scale chromatin structure*. I developed molecular biology and automated imaging systems to rapidly assess the effects of transcriptional activators on large-scale chromatin structure by fluorescence microscopy. My work also became the foundation for studies of engineered regions of the genome, the movement of genes within the nucleus upon gene activation, and chromatin-related high-throughput screens.

Research assistantship: Laboratory of Chris Q. Doe at the Univ. Illinois, Urbana-Champaign. Summer 1997. *Enhancers in Drosophila neural development*.

Howard Hughes Medical Institute Undergraduate research fellowship: Laboratory of Robert E. Malone at the Univ. Iowa. Summer 1996. *Control of recombination in yeast*.

Professional Society Memberships

Fellow, Massachusetts Academy of Sciences, 2008
 American Association for the Advancement of Science, 2006
 Association for Women in Science, 2006
 American Society for Cell Biology, 2005
 International Society for Analytical Cytology, 2005
 Computational & Systems Biology Initiative (MIT), 2003
 Society for Laboratory Automation and Screening, 2002
 Phi Beta Kappa, 1997
 Phi Kappa Phi, 1997

Teaching

- Guest speaker, Marine Biological Laboratory course, “Computational Image Analysis in Cellular and Developmental Biology”, Woods Hole, MA, October 14, 2011
- Guest speaker, Fayerweather Street School, Cambridge, MA, May 13, 2011
- Panel member, “Career Session II: Interdisciplinary Collaborations” at the Second NCI Tumor Microenvironment Network Junior Investigator Meeting, Cambridge, MA, May 2011
- Teacher for Swiss Institute of Bioinformatics/Netherlands Bioinformatics Centre summer course on quantitative imaging and modeling of biological processes, August 2010.
- Guest virtual speaker, North Dickinson High School, MI, February 4, 2010
- Instructor, Blended Learning Open-Source Math or Science Studies (BLOSSOMS) program, 2009 (<http://blossoms.mit.edu/video/carpenter.html>)
- Guest speaker, Cambridge Rindge & Latin High School, Cambridge, MA, February 27, 2009
- Guest lecturer, Harvard Chemical Biology 2200, January 26, 2009
- Guest speaker, Faith Academy Mindanao, Davao City, Philippines, November 17, 2008
- Guest speaker, Broad Institute Midsummer Night's Science Series, Cambridge, MA, July 2008
- Workshop leader/speaker, “Robots and Disease: Modeling Biomedical Research in your Classroom”, 13th Annual Symposium on Biotechnology Education for high school teachers, Museum of Science, Boston, MA, March 31, 2008
- Guest speaker, Society for Advancement of Chicanos and Native Americans in Science, Broad Institute, March 21, 2008
- Panelist, American Junior Academy of Science at AAAS, Boston, MA, February 16, 2008
- Broad 101 public lecture, Cambridge, MA, February 2008
- Guest speaker, Career Advancement in the Biol. Sciences, U. Oregon, January 11, 2008
- Teacher (volunteer), Advanced Editing for Scientists with English as a Second Language (ESL), Park Street Church, Fall semester 2007
- Guest speaker, Cambridge Rindge and Latin Public High School, May 21, 2007
- Guest speaker, Whitehead Spring Lectures for High School Students, April 19, 2005
- Guest speaker/mentor, Museum of Science Women in Research day, April 2, 2005
- Guest mentor, Museum of Science Women in Research day, April 3, 2004
- Teaching assistant, CSB300: taught lecture/discussion sessions for graduate students and advanced undergraduates in Cell and Molecular Biology course; rated in top 10% of TA's campus-wide, Fall 1999
- Guest speaker for elementary age students in Discover Club, Champaign, IL Sept. 1998

Professional Service

Administration and conference/workshop chairing

- Program Committee member, 2012 ACM Conference on Bioinformatics, Computational Biology and Biomedicine (ACMBCB'12)
- Steering Committee member, BioImage Informatics 2012
- Co-organizer and session chair, Cold Spring Harbor Laboratories, “Automated Imaging and High-throughput Phenotyping” conference, April 10-14, 2012

Program Committee member, Intelligent Systems for Molecular Biology and European Conference on Computational Biology (ISMB/ECCB) annual conference, July 2011, Vienna, Austria

Session chair, "Image cytometry in physiologically relevant contexts: co-cultured cells and whole organisms," ISAC CYTO 2011 Congress, May 2011, Baltimore, MD

Co-chair, special session on "Current challenges in image analysis for high-throughput microscopy" at IEEE International Symposium on Biomedical Imaging (ISBI), March 2011, Chicago, IL

Session moderator, "To screen or not to screen," American Society for Cell Biology Meeting, December 2010, Philadelphia, PA

Co-organizer, Cold Spring Harbor Laboratories, "Automated Imaging and High-throughput Phenotyping" conference, December 5-9, 2010

Program Committee member, International Society for Advancement of Cytometry (ISAC) annual CYTO conference, 2008-2011

Member, Lawrence Summers Fellowship Committee, August 2008

Co-chair, BioImage Informatics workshop, Santa Barbara, CA, January 17-18, 2008

Scientific program co-organizer, Broad Institute Retreat, November 2007 and 2008

Student representative, Vice Chancellor for Research Search Committee, Univ. Illinois, 2002

Student representative, Department Graduate recruiting committee, Univ. Illinois, 2002

Coordinator for abstracts & speakers, NIH Training Grant Symposium, Univ. Illinois, 2000

Student representative, NIH Cell & Molecular Biology Training Grant Executive committee, Univ. Illinois, 1999-2003

Co-chair, Department Student Seminars, University of Illinois, 1998-2000

Journal reviewer

Ad-hoc reviewer for Bioinformatics, BMC Bioinformatics, BMC Genomics, Cell, Biotechniques, Journal of Biomolecular Screening, Journal of Cell Science, Nature, Nature Methods, Nature Reviews Molecular Cell Biology, Nucleic Acids Research, PLoS Computational Biology

Grant reviewer

Ad-hoc reviewer for NIH Biodata Management and Analysis Study Section, NIH Microscopy Imaging Study Section, and NIH Director's Opportunity for Research in Five Thematic Areas (RC4)

Invited Lectures

80. Yale University West Campus, November 2011, West Haven, CT
79. Non-Clinical Biostatistics Conference, October 2011, Boston, MA
78. Ontario Consortium for Regeneration Inducing Therapeutics Conference (OCRiT), October 2011, Kitchener, ON - Delivered Keynote address
77. University of Toronto Donnelly Centre for Cellular and Biomolecular Research Seminar Series, October 2011, Toronto, ON
76. University of Virginia, September 2011, Charlottesville, VA
75. Bioimage Informatics II, HHMI Janelia Farm, September 2011, Ashburn, VA
74. ISAC CYTO 2011 Congress, May 2011, Baltimore, MD
73. IEEE International Symposium on Biomedical Imaging (ISBI), March 2011, Chicago, IL
72. Carnegie-Mellon University: BioImaging Day, February 2011, Pittsburgh, PA
71. Brown University, February 2011, Providence, RI

70. Cold Spring Harbor Laboratories: Automated Imaging and High-throughput Phenotyping, December 2010, Cold Spring Harbor, NY
69. American Society of Cell Biologists, December 2010, Philadelphia, PA
68. Sharp Laboratories, September 2010, Camas, WA
67. University of Kansas, September 2010, Lawrence, KS
66. University of Texas Southwestern Medical Center, September 2010, Dallas, TX
65. Turning Images to Knowledge: Large-Scale 3D Image Annotation, Management, and Visualization, HHMI Janelia Farm, May 2010, Ashburn, VA
64. Imaging Transcription in Living Cells, HHMI Janelia Farm, March 2010, Ashburn, VA
63. EMBO Workshop: Visualizing Biological Data (VizBi), March 2010, Heidelberg, Germany
62. Discovery on Target: RNAi for Screening Cellular Pathways and Targets, November 2009, Boston, MA
61. High Content Analysis East, September 2009, Boston, MA
60. Dana-Farber Cancer Institute, January 2009, Boston, MA
59. Massachusetts Biotechnology Council, December 2008, Cambridge, MA
58. Human Genome Organization High Content Cellular Screening Workshop, November 2008, Singapore
57. University of Wisconsin-Madison, October 2008, Madison, WI
56. University of Illinois at Urbana-Champaign, October 2008, Urbana, IL
55. Eli Lilly, September 2008, Indianapolis, IN
54. American Scientific Affiliation, August 2008, Newberg, OR
53. Worm Genomics and Systems Biology Workshop, July 2008, Cambridge, MA
52. Gordon Conference on Lasers In Medicine & Biology, July 2008, Holderness, NH
51. Hinxton retreat on High-throughput cell-based screening (Wellcome Trust/EBI), July 2008, Cambridge, UK
50. Institute of Molecular Systems Biology, July 2008, ETH Zurich
49. AAAS Annual Meeting, "Young Scientist Breakfast" in partnership with the American Junior Academy of Science (AJAS), February 2008, Boston, MA
48. BioImage Informatics, January 2008, Santa Barbara, CA
47. High Content Analysis Conference, January 2008, San Francisco, CA
46. University of Oregon, January 2008, Eugene, OR
45. Amgen, January 2008, S. San Francisco, CA
44. UCSF, January 2008, San Francisco, CA
43. Odyssey Thera, January 2008, San Ramon, CA
42. Rigel Pharmaceuticals, January 2008, S. San Francisco, CA
41. JASON fall meeting, November 2007, McLean, VA
40. Compucyte, November 2007, Cambridge, MA
39. New England Cytometry Annual Meeting, October 2007, Cambridge, MA
38. Gordon Research Conference on Bioinformatics: the Interface of Computation and Experiment, July 2007, Andover, NH
37. Open Microscopy Environment User's Meeting, March 2007, Paris, France
36. Genomics Institute of the Novartis Foundation, November 2006, San Diego, CA
35. Burnham Institute, November 2006, San Diego, CA
34. Broad Institute Retreat, October 2006, Boston, MA
33. Life Sciences Research Foundation Annual Meeting, October 2006, Baltimore, MD
32. Stowers Institute, September 2006, Kansas City, MO
31. Society for Biomolecular Screening Annual Meeting, September 2006, Seattle, WA
30. Institute for Systems Biology, September 2006, Seattle, WA

29. St. Jude's Children's Research Hospital, September 2006, Memphis, TN
28. Novartis Institute for Biomedical Research, August 2006, Cambridge, MA
27. Purdue University, August 2006, W. Lafayette, IN
26. Northwestern University, August 2006, Evanston, IL
25. Merck/ Computational Systems Biology Initiative meeting, June 2006, Boston, MA
- Delivered Keynote address
24. Internat'l Society for Analytical Cytology Congress, May 2006, Quebec City, Canada
- Served as session chair: Image Processing and Analysis
23. Academic Strategies for High-Throughput and High-Content Pathway Analysis, May 2006, Houston TX
22. Harvard Mini Symposium on Image Analysis, April 2006, Boston, MA
21. Stowers Institute, February 2006, Kansas City, MO
20. High-Content Analysis CHI, January 2006, San Francisco, CA
19. Harvard Department of Systems Biology, November 2005, Boston, MA
18. Cytometry Development Workshop, Asilomar, October 2005, Pacific Grove, CA
17. Merck Automated Biotechnology group, October 2005, North Wales, PA
16. MipTec Enabling Technologies for Drug Discovery, May 2005, Basel, Switzerland
- Oral presentation honorable mention
15. Roche, May 2005, Nutley, NJ
14. Novartis Institute for Biomedical Research, December 2004, Cambridge, MA
13. NIH Chemical Genomics Center Seminar, September 2004, Bethesda, MD
12. Society for Biomolecular Screening Annual Meeting, September 2004, Orlando, FL
- 11 RNAi: Mechanisms and Applications, June 2004, Les Treilles, France
10. Association for Laboratory Automation LabFusion, June 2004, Boston, MA
9. MIT Center for Cancer Research Friday Focus Seminar, May 2004, Cambridge, MA
8. University of Amsterdam seminar, May, 2004, Amsterdam, The Netherlands
7. RNAi for Pathway Analysis, April 2004, Boston, MA
6. Keystone Symposium-New Advances in Drug Discovery, March 2004, Keystone, CO
5. Association of Biological Resource Facilities Meeting: Integrating Technologies in Proteomics and Genomics, March 2004, Portland, OR
- Served as session chair: "Cell Array Based Assays"
4. HHMI Fellows' Meeting, Nov. 2001, Howard Hughes Medical Institute, Chevy Chase, MD
3. CMB/MB Training Grant Symposium, Nov. 2001, University of Illinois, Urbana, IL
- Best talk award
2. CSB Student Seminar Series, Sept. 2001, University of Illinois, Urbana, IL
1. Cell & Structural Biology Department symposium, Sept. 2000, University of Illinois, Urbana, IL

Publications

Publications are available at <http://www.broadinstitute.org/~anne>

(please note name change in 2003 from AC Nye to AE Carpenter)

59. Wählby C, Kamentsky L, Liu ZH, Riklin-Raviv T, Conery AL, O'Rourke EJ, Sokolnicki KL, Visvikis O, Ljosa V, Irazoqui JE, Golland P, Ruvkun G, Ausubel FM, **Carpenter AE** (2012). An image analysis toolbox for high-throughput *C. elegans* assays. *Nature Methods* / doi: 10.1038/nmeth.1984. PMID: 22522656 PMCID: In process (Research article)

58. Unadkat HV, Hulsman M, Cornelissen K, Papenburg BJ, Truckenmüller, **Carpenter AE**, Wessling M, Post GF, Uetz M, Reinders MJT, Stamatialis D, van Blitterswijk CA, de Boer J (2012). An algorithm-based topographical biomaterials library to instruct cell fate. *PNAS* (available online before print)/doi: 10.1073/pnas.1204360109. PMID: 22454500 PMCID: PMC3326488 (Research article)
57. Kitami T, Logan DJ, Negri J, Hasaka T, Tolliday NJ, **Carpenter AE**, Spiegelman BM, Mootha VK (2012). A chemical screen probing the relationship between mitochondrial content and cell size. *PLoS ONE* 7(3):e33755. PMID: 22479437 PMCID: PMC3315575 (Research article)
56. Bray, M-A, Fraser AN, Hasaka TP, **Carpenter AE** (2012) Workflow and metrics for image quality control in large-scale high-content Screens. *Journal of Biomolecular Screening* 17(2):135-143 / doi: 10.1177/1087057111420292. PMID: 21956170 PMCID: In process (Research article)
55. Pretorius AJ, Bray M-A, **Carpenter AE**, Ruddle R (2011) Visualization of parameter space for image analysis. In *InfoVis 2011* (Proceedings of the 2011 IEEE Symposium on Information Visualization), 2402-11 / doi: <http://doi.ieeecomputersociety.org/10.1109/TVCG.2011.253>. PMID: 22034361 PMCID: In process (Research article)
54. Peterson TR, Sengupta SS, Harris TE, Carmack AE, Balderas E, Guertin DA, Madden KL, **Carpenter AE**, Finck BN, Sabatini DM (2011) mTOR complex 1 regulates lipin 1 localization to control the SREBP pathway. *Cell* 146(3):408-420 / doi: 10.1106/j.cell2011.06.034 PMID: 2186276 PMCID: In process
53. **Carpenter AE** (2011) Extracting biomedically important information from large, automated imaging experiments. In *ISBI 2011* (Proceedings of the IEEE International Symposium on Biomedical Imaging: From Nano to Macro), 1723-1726 / doi: 10.1109/ISBI.2011.5872737. PMID: In process PMCID: In process (Research article)
52. Kamensky L, Jones TR, Fraser A, Bray M, Logan D, Madden K, Ljosa V, Rueden C, Harris GB, Eliceiri K, **Carpenter AE** (2011) Improved structure, function, and compatibility for CellProfiler: modular high-throughput image analysis software. *Bioinformatics* 2011 / doi: 10.1093/bioinformatics/btr095. PMID: 21349861 PMCID: PMC3072555 (Research article)
51. Elkabets M, Gifford AM, Scheel C, Nilsson B, Reinhardt F, Bray MA, **Carpenter AE**, Jirstrom K, Magnusson K, Ebert BL, Pontén F, Weinberg RA, McAllister SS (2011) Human tumors instigate granulosa-expressing hematopoietic cells that promote malignancy by activating stromal fibroblasts in mice. *Journal of Clinical Investigation* 121(2): 784-99 / doi:10.1172/JCI43757. PMID: 21266779 PMCID: PMC3026724 (Research article)
50. Lindquist RA, Ottina KA, Wheeler DB, Hsu PP, Thoreen CC, Guertin DA, Siraj MA, Sengupta S, Shaul YD, Lamprecht MR, Madden KL, Papallo AR, Jones T, Sabatini DM, **Carpenter AE** (2011) Genome-scale RNAi on living-cell microarrays identifies novel regulators of *Drosophila melanogaster* TORC1 - S6K pathway signaling. *Genome Research* 21(3):433-446 / doi: 10.1101/gr.111492.110. PMID: 21239477 PMCID: PMC3044857 (Research article)

- 49.* Kim K, Rowat AC, **Carpenter AE** (2010) Automated tracking of yeast cell lineages. *Proc. SPIE* 7798, 779823/ doi:10.1117/12.859770. PMID: none (Research article)
- 48.* **Carpenter AE** (2010) High-content screening: Practical advice, tools and resources. *SBS News* 48:5, October 2010. PMID: None
- 47.* **Carpenter AE** (2010) High-content screening: FAQs about trends, technologies, and outcomes. *SBS News* 47:2, August 2010. PMID: none
46. Riklin-Raviv T, Ljosa V, Conery AL, Ausubel FM, **Carpenter AE**, Golland P, Wählby C (2010) Morphology-guided graph search for untangling objects: *C elegans* analysis. In *Medical Image Computing and Computer Assisted Intervention (MICCAI) 2010*; 13(3):634-641 / doi:10.1007/978-3-642-15711-0_79. PMID: 20879454 PMCID: PMC3048333 (Research article)
45. Wählby C, Riklin-Raviv T, Ljosa V, Conery AL, Golland P, Ausubel FM, **Carpenter AE** (2010) Resolving clustered worms via probabilistic shape models. In *ISBI 2010* (Proceedings of the IEEE International Symposium on Biomedical Imaging: From Nano to Macro), 552-555 / Doi:10.1109/ISBI.2010.5490286 PMID: 21383863 PMCID: PMC3048333 (Research article)
44. Cataldo AM, McPhie DL, Lange NT, Punzell S, Elmiligy, Ye NZ, Froimowitz MP, Hassinger LC, Menesale EB, Sargent LW, Logan DJ, **Carpenter AE**, Cohen BM (2010) Abnormalities in Mitochondrial Structure in Cells of Patients with Bipolar Disorder. *American Journal of Pathology* 177(2)/ doi:10.2353/ajpath.2010.081068. PMID: 20566748 PMCID: PMC2913344 (Research article)
43. Logan DJ and **Carpenter AE** (2010) Screening Cellular Feature Measurements for Image-based Assay Development. *Journal of Biomolecular Screening* 15(7):840-6/ doi:10.1177/10870571103708695. PMID: 20516293 PMCID: PMC3145348 (Research article)
42. Castoreno AB, Smurnyy Y, Torres AD, Vokes MS, Jones TR, **Carpenter AE**, Eggert US (2010) Small molecules discovered in a pathway screen target the Rho pathway in cytokinesis. *Nature Chemical Biology* doi:10.1038/nchembio.363. PMID: 20436488 PMCID: PMC2873065 (Research article)
41. Walter T, Shattuck DW, Baldock R, Bastin ME, **Carpenter AE**, Duce S, Ellenberg J, Fraser A, Hamilton N, Pieper S, Ragan MA, Schneider JE, Tomancak P, Heriche JK (2010). Visualization of image data from cells to organisms. *Nature Methods* 7:S26-41. PMID: 20195255 PMCID: In process (Research article)
40. Ljosa V, **Carpenter AE** (2009) Introduction to the Quantitative Analysis of Two-Dimensional Fluorescence Microscopy Images for Cell-Based Screening. *PLoS Computational Biology* 5(12): e1000603/ doi:10.1371/journal.pcbi.1000603. PMID: 20041172 PMCID: PMC2791844 (Tutorial)

39. Tsui M, Xie T, Orth JD, **Carpenter AE**, Rudnicki S, Kim S, Shamu CE, Mitchison TJ (2009). An intermittent live cell imaging screen for siRNA enhancers and suppressors of a kinesin-5 inhibitor. *PLoS ONE* 4(10):e7339. PMID: 19802393 PMCID: PMC2752188 (Research article)
38. Moy TI, Conery AL, Larkins-Ford J, Wu G, Mazitschek R, Casadei G, Lewis K, **Carpenter AE**, Ausubel FM (2009) High throughput screen for novel antimicrobials using a whole animal infection model. *ACS Chemical Biology* 4/ doi:10.1021/cb900084v. PMID: 19572548 PMCID: PMC2745594 (Research article)
37. Nilsson B, Johansson M, Al-Shahrour F, **Carpenter AE**, Ebert BL (2009) Ultrasome: efficient aberration caller for copy number studies of ultra-high resolution. *Bioinformatics* 25(8):1078-1079/ doi: 10.1093/bioinformatics/btp091. PMID: 19228802 (Research article)
36. Jones TR**, **Carpenter AE****, Lamprecht MR, Moffat J, Silver SJ, Grenier JK, Castoreno AB, Eggert US, Root DE, Golland P, Sabatini DM (2009) Scoring diverse cellular morphologies in image-based screens with iterative feedback and machine learning. *PNAS* 106(6):1826-1831/ doi: 10.1073/pnas.0808843106. PMID: 19188593 PMCID: PMC2634799 (Research article)
**These authors contributed equally.
35. Jones TR, Kang IH, Wheeler DB, Lindquist RA, Papallo A, Sabatini DM, Golland P, **Carpenter AE** (2008) CellProfiler Analyst: data exploration and analysis software for complex image-based screens. *BMC Bioinformatics* 9(1):482/ doi: 10.1186/1471-2105-9-482. PMID: 19014601 PMCID: PMC261443 (Research article)
34. Pan H, Yu J, Zhang L, **Carpenter AE**, Zhu, H, Li L, Ma D, Yuan J (2008) A novel small molecule regulator of guanine nucleotide exchange activity of ARF and golgi membrane trafficking. *Journal of Biological Chemistry* 10.1074/jbc.M806592200. PMID: 18799457 PMCID: PMC2576541 (Research article)
- 33*. Vokes MS, **Carpenter AE** (2008) CellProfiler: Open-source software to automatically quantify images. *Microscopy Today* 16(5):38-39 PMID: none (Short review)
32. Ljosa V, **Carpenter AE** (2008) High-throughput screens for fluorescent dye discovery. *Trends in Biotechnology* 26(10):527-30 PMID: 18706725 (Review)
31. Vokes MS, **Carpenter AE** (2008) Using CellProfiler for automatic identification and measurement of biological objects in images. In: Ausubel FM et al., eds. *Current Protocols in Molecular Biology* 82:14.17.1-14.17.12. PMID: 18425761 (Book chapter)
30. **Carpenter AE** (2007) Image-based chemical screening. *Nature Chemical Biology* 3:461-465. PMID: 17637778 (Review article)
29. **Carpenter AE** (2007) Extracting rich information from images. In: Clemons PA et al., eds. *Cell-Based Assays for High-Throughput Screening, Methods in Molecular Biology* 486:14. New York, NY: Humana Press; 193-211. PMID: 19347625 (Book chapter)
- 28*. Jones TR and **Carpenter AE** (2007) Flexible image analysis. *Biophotonics Journal*, 14(7):31-32. PMID: none (Short review)

- 27*. **Carpenter AE** (2007) Software opens the door to quantitative imaging. *Nature Methods*. 4(2):120-1. PMID: 17264858 (Short review article)
26. Lamprecht MR, Sabatini DM, **Carpenter AE** (2007) CellProfiler: free, versatile software for automated biological image analysis. *Biotechniques*. 42(1):71-75. PMID: 17269487 (Research article)
25. **Carpenter AE**, Jones TR, Lamprecht MR, Clarke C, Kang IH, Friman O, Guertin DA, Chang JH, Lindquist RA, Moffat J, Golland P, Sabatini DM (2006) CellProfiler: image analysis software for identifying and quantifying cell phenotypes. *Genome Biology*, 7:R100. PMID: 17076895 PMCID: PMC1794559 (Research article)
24. Hartwell KH, Muir B, Reinhardt F, **Carpenter AE**, SgROI DC, Weinberg RA (2006) The Spemann Organizer gene, Goosecoid, promotes tumor metastasis. *PNAS*. 103(50):18969-74 PMID: 17142318 PMCID: PMC1748161 (Research article)
23. Cowen LE, **Carpenter AE**, Matangkasombut O, Fink GR, Lindquist S (2006) Genetic architecture of Hsp90-dependent drug resistance. *Eukaryotic Cell*. 5(12):2184-8. PMID: 17056742 PMCID: PMC1694807 (Research article)
22. Baltus AE, Menke DB, Hu YC, Goodheart ML, **Carpenter AE**, de Rooij DG, Page DC (2006) In germ cells of mouse embryonic ovaries, the decision to enter meiosis precedes premeiotic DNA replication. *Nature Genetics*. 38(12):1430_1434. PMID: 17115059 (Research article)
21. Jones TR, **Carpenter AE**, Sabatini DM, Golland P (2006) Methods for high-content, high throughput image-based cell screening. *Proceedings of the Workshop on Microscopic Image Analysis with Applications in Biology (MIAAB)*. Metaxas DN, Whitaker RT, Rittcher J, Sebastian T (Eds). Copenhagen, Denmark, October 5, pp 65-72. PMID-none (Research article)
- Updated as a book chapter:*
- Jones TR, **Carpenter AE**, Sabatini DM, Golland P (2008) Methods for high-content, high throughput image-based cell screening. In: Rittscher J, Machiraju R, Wong STC, editors. *Microscopic Image Analysis for Life Science Applications*. Norwood, MA: Artech House Publishers, pp. 209-221 (Book chapter)
20. Sigal A, Milo M, Cohen A, Geva-Zatorsky N, Klein Y, Alaluf I, Swerdlin N, Perzov N, Danon T, Liron Y, Raveh T, **Carpenter AE**, Lahav G, Alon U (2006) Dynamic proteomics in individual human cells uncovers widespread cell-cycle dependence of nuclear proteins. *Nature Methods*, 3(7):525-31. PMID: 16791210 (Research article)
19. Chuang CH, **Carpenter AE**, Fuchsova B, Johnson T, de Lanerolle P, Belmont AS (2006) Long-range directional movement of an interphase chromosome site. *Current Biology*, 16(8):825-31. PMID: 16631592 (Research article)
18. Moffat J, Grueneberg DA, Yang X, Kim SY, Kloepfer AM, Hinkle G, Piqani B, Eisenhaure TM, Luo B, Grenier JK, **Carpenter AE**, Foo SY, Stewart SA, Stockwell BR, Hacohen N, Hahn WC, Lander ES, Sabatini DM, Root DE (2006) A lentiviral RNAi library for human and mouse genes applied to an arrayed viral high-content screen. *Cell*, 124(6):1283-98. PMID: 16564017

(Research article)

17. Bailey SN, Ali SM, **Carpenter AE**, Higgins CO, Sabatini DM (2006) Microarrays of lentiviruses for gene function screens in immortalized and primary cells. *Nature Methods*, 3(2):117-22. PMID: 16432521 (Research article)
16. Jones TR, **Carpenter AE**, Golland P (2005) Voronoi-based segmentation of cells on image manifolds. *Proceedings of the Workshop on Computer Vision for Biomedical Image Applications (CVBIA)*. Yanxi Liu, Tianzi Jiang, Changshui Zhang (Eds.). Beijing, China, October 21. Lecture Notes in Computer Science 3765. Published by Springer-Verlag, Berlin, p. 535-543, ISBN 3-540-29411-2. PMID-none (Research article)
15. Wheeler DB, **Carpenter AE**, Sabatini DM (2005) Cell microarrays and RNA interference chip away at gene function. *Nature Genetics*, 37 Supplement: S25-30. PMID: 15920526 (Review)
14. Verschure PJ, van der Kraan I, de Leeuw W, van der Vlag J, **Carpenter AE**, Belmont AS, van Driel R (2005) In vivo HP1 targeting causes large-scale chromatin condensation and enhanced histone lysine methylation. *Molecular and Cellular Biology*, 25(11): 4552-64. PMID: 15899859 PMCID: PMC1140641 (Research article)
13. Rai D, Frolova A, Frasor J, **Carpenter AE**, Katzenellenbogen BS (2005) Distinctive actions of membrane-targeted versus nuclear localized estrogen receptors in breast cancer cells. *Molecular Endocrinology*, 19(6):1606-17. PMID: 15831524 (Research article)
12. Wheeler DB, Bailey SN, Guertin DA, **Carpenter AE**, Higgins CO, Sabatini DM (2004) RNAi living-cell microarrays for loss-of-function screens in *Drosophila melanogaster* cells. *Nature Methods*, 1(2):127-32. PMID: 15782175 (Research article)
11. **Carpenter AE**, Memedula S, Plutz MJ, Belmont AS. Common effects of acidic activators on large-scale chromatin structure and transcription (2005) *Molecular and Cellular Biology*, 25(3):958-968. PMID: 15657424 PMCID: PMC544008 (Research article)
10. **Carpenter AE**, Ashouri A, Belmont AS (2004) Automated microscopy identifies estrogen receptor subdomains with large-scale chromatin structure unfolding activity. *Cytometry A*, 58A(2):157-166. PMID: 15057969 (Research article)
9. **Carpenter AE**, Sabatini DM (2004) Systematic genome-wide screens of gene function. *Nature Reviews Genetics*, 5(1):11-22. PMID: 14708012 (Review)
- 8*. **Carpenter AE**, Belmont AS (2004) Direct visualization of transcription factor-induced chromatin remodeling and cofactor recruitment in vivo. *Methods in Enzymology*, 375:366-81. PMID: 14870678 (A methods paper which includes substantial unpublished research)
7. Nye AC, Rajendran RR, Belmont AS (2003) Chromosomes and Chromatin. In: Cooper DN (ed.) *Nature Encyclopedia of the Human Genome*, vol. 1:766-773. London: Nature Publishing Group. PMID-none (Review)

6. Rajendran RR, **Nye AC**, Frasor J, Balsara RD, Martini PGV, Katzenellenbogen BS (2003) Regulation of nuclear receptor transcriptional activity by a novel DEAD box RNA helicase (DP97). *Journal of Biological Chemistry*, 278(7):4628-38. PMID: 12466272 (Research article)
5. **Nye AC**, Rajendran RR, Stenoien DL, Mancini MA, Katzenellenbogen BS, Belmont AS (2002) Alteration of large-scale chromatin structure by estrogen receptor. *Molecular and Cellular Biology*, 22(10): 3437-49. PMID: 11971975 PMCID: PMC133805 (Research article)
4. Ye Q, Hu YF, Zhong H, **Nye AC**, Belmont AS, Li R (2001) BRCA1-induced large-scale chromatin unfolding and allele-specific effects of cancer-predisposing mutations. *Journal of Cell Biology*, 155(6):911-21. PMID: 11739404 PMCID: PMC2150890 (Research article)
3. Stenoien DL, **Nye AC**, Mancini MG, Patel K, Dutertre M, O'Malley BW, Smith CL, Belmont AS, Mancini MA (2001) Ligand-mediated assembly and real-time cellular dynamics of estrogen receptor alpha-coactivator complexes in living cells. *Molecular and Cellular Biology*, 21(13):4404-12. PMID: 11390668 PMCID: PMC87100 (Research article)
- 2*. **Nye AC**, Rajendran RR, Katzenellenbogen BS, Belmont AS (2000) The estrogen receptor alters large-scale chromatin structure. *Trends in Cell Biology GFP in Motion CD-ROM*, volume 2, ed. B Ludin and A Matus. PMID-none (Movie & caption)
- 1*. Belmont AS, Dietzel SD, **Nye AC**, Tumber T, Strukov Y (1999) Large scale chromatin structure and function. *Current Opinion in Cell Biology*, 11(3):307-311. PMID: 10395564 (Review)

* = Not peer reviewed.