Resource Summary Report

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Computer Integrated Systems for Microscopy and Manipulation

RRID:SCR_001413
Type: Tool

Proper Citation

Computer Integrated Systems for Microscopy and Manipulation (RRID:SCR_001413)

Resource Information

URL: http://cismm.cs.unc.edu/

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Description: Biomedical technology research center that develops force technologies applicable over a wide range of biological settings, from the single molecule to the tissue, with integrated systems that orchestrate facile instrument control, multimodal imaging, and analysis through visualization and modeling. The Force Microscope Technologies Core designs instruments in an area of science where there are unusual opportunities: the measurement of forces and the integration with optical microscopy. Force technologies play the obvious role of both measuring events in the sample and modifying the sample during the experiment. It is through the microscope that the force data is correlated with simultaneous 3D optical images. The force technology development includes the magnetic bead technology in the 3D Force Microscope project, Atomic Force Microscopy in the nanoManipulator project, and Control Software to drive the instrumentation. This core is focused on providing the physical capability to perform the experiments and probe structure/property correlations. The Ideal User Interfaces core makes the connection between the user and the instrument, the model building, and the data. This includes control systems that allow the user to move the bead inside the cell culture with a handheld pen and the visualization techniques to view the optical microscope data as a rendered 3D image collocated with the force data. Using data to create, change, and understand a model is the focus of the Advanced Model Fitting and Analysis core. The quantitative reduction of images to structural, shape, and velocity parameters is the goal of Image Analysis. The immediate understanding of correlations across image fields and between data sets in the challenge of Visualization. The power of combining the strength of a computer science graphics group with a microscopy technology group is most evident in the Graphics Hardware Acceleration

project, which seeks to harness the speed of graphics processors for microscope data analysis and simulation. The Advanced Technology core pushes the boundaries of the Human Computer Interface through the investigation of improved techniques for the interaction of users with virtual environments, the real time lighting of virtual settings, and the enabling of multi-person collaboration. These techniques are validated and evaluated through physiological measures in virtual environments effectiveness evaluation studies.

Abbreviations: CISMM

Synonyms: UNC Chapel Hill Computer Integrated Systems for Microscopy and Manipulation

Resource Type: training resource

Keywords: microscope, visual analytics, image analysis, biomedical, bioinstrumatics, scanning electron microscope, light microscope, microscopy

Related Condition: Thrombosis, Lung disease, Cancer

Funding: NIBIB 5-P41-EB002025

Availability: Free, (services, Assistance, Expertise and use of the facility), Other incurred costs, E.g., Non re-usable items (such as scanning tips) will be borne by the visitor.

Resource Name: Computer Integrated Systems for Microscopy and Manipulation

Resource ID: SCR_001413

Alternate IDs: nlx_152648

Record Creation Time: 20220129T080207+0000

Record Last Update: 20250410T064710+0000

Ratings and Alerts

No rating or validation information has been found for Computer Integrated Systems for Microscopy and Manipulation.

No alerts have been found for Computer Integrated Systems for Microscopy and Manipulation.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 8 mentions in open access literature.

Listed below are recent publications. The full list is available at dkNET.

Boulter E, et al. (2018) Cell metabolism regulates integrin mechanosensing via an SLC3A2-dependent sphingolipid biosynthesis pathway. Nature communications, 9(1), 4862.

Marjoram RJ, et al. (2016) Using magnets and magnetic beads to dissect signaling pathways activated by mechanical tension applied to cells. Methods (San Diego, Calif.), 94, 19.

Scott DW, et al. (2016) Tension on JAM-A activates RhoA via GEF-H1 and p115 RhoGEF. Molecular biology of the cell, 27(9), 1420.

Xu T, et al. (2015) SOAX: a software for quantification of 3D biopolymer networks. Scientific reports, 5, 9081.

Osborne LD, et al. (2014) TGF-? regulates LARG and GEF-H1 during EMT to affect stiffening response to force and cell invasion. Molecular biology of the cell, 25(22), 3528.

Bays JL, et al. (2014) Vinculin phosphorylation differentially regulates mechanotransduction at cell-cell and cell-matrix adhesions. The Journal of cell biology, 205(2), 251.

Seagrave J, et al. (2012) Effects of guaifenesin, N-acetylcysteine, and ambroxol on MUC5AC and mucociliary transport in primary differentiated human tracheal-bronchial cells. Respiratory research, 13(1), 98.

Guilluy C, et al. (2011) The Rho GEFs LARG and GEF-H1 regulate the mechanical response to force on integrins. Nature cell biology, 13(6), 722.