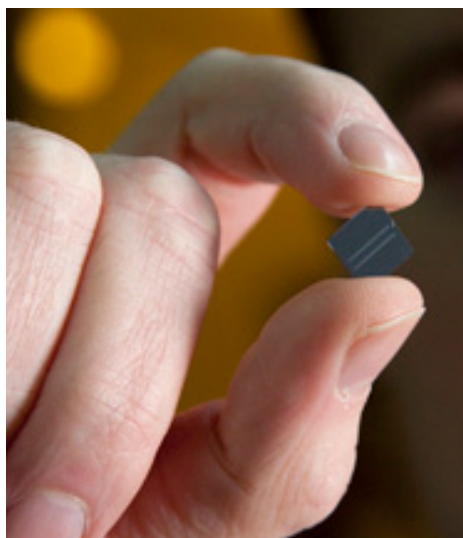


FACULTY newsletter

CPMS Physical and Mathematical Sciences



ABOVE BYU researchers have developed an inexpensive microchip that could revolutionize biological testing.

Researchers Assist in Medical Advancement

Three CPMS faculty members have assisted in the development of a groundbreaking new silicon microchip that reliably detects viruses.

Dennis Tolley, a professor in the Department of Statistics, and Adam Wooley and Milton Lee, both of the Department of Chemistry and Biochemistry, each lent their expertise to the chip's research and development and are listed as co-authors on the paper.

The chip provides an inexpensive means for physicians and lab technicians to test their patients' samples for various proteins or viruses. Current testing techniques are fairly inaccurate unless a large concentration of a virus is present. However, the chip developed by BYU researchers screens for particles according to size, allowing it to accumulate many particles that would otherwise be missed by other tests.

The hope among researchers is that, with this

new advancement, use of "lab on a chip" technology will become more widespread. Rather than waiting for lab test results to return, doctors will be able to detect and treat viruses early, before any real damage occurs.

Mark N. Hamblin, a Ph.D. candidate in the BYU Fulton College of Engineering and Technology, is the paper's lead author. The project has been supervised by Aaron Hawkins, a BYU professor of electrical and computer engineering, and also includes research input from professors Jie Xuan and Daniel Maynes. The paper was recently published in *Lab on a Chip*, the leading scientific journal devoted to the development of chip-based biological tests.

by: Steve Pierce

IMPORTANT DATES TO REMEMBER

- Graduate Award Mentoring Applications DUE
January 8
- Spring Research Conference Web Site Open for Abstract Submission
January 15
- College Award Nominations DUE
January 21
- College Annual Awards Banquet
January 28, 6pm
WSC Ballroom
- University Award Nominations DUE
February 1

COLLEGE PUBLICATIONS

Chemistry and Biochemistry

[Peterson, M.A.](#); Christiansen, M.A.; Cutler, C.E.; *Bioorg. Med. Chem Lett*, 2009, 19, 6775-6779. Preliminary SAR Analysis of Novel Antiproliferative N6,5'-Bis-ureidoadenosine Derivatives.

Budzinski, K.L.; Allen, R.W.; Fujimoto, B.S.; Kensen-Hammes, P.; [Belnap, D.M.](#); Bajjalieh, S.M.; Chiu, D.T.; *Biophys. J.*, 2009, 97, 2577-2584. Large Structural Change in Isolated Synaptic Vesicles Upon Loading With Neurotransmitter.

Pound, E.; Ashton, J.R.; Becerril, H.A.; [Woolley, A.T.](#); *Nano Letters*, 2009, 9, 12, 4302-4305. Polymerase Chain Reaction Based Scaffold Preparation for the Production of thin, Branches DNA Origami Nanostructures of Arbitrary Sizes.

Fang, L.; Tartakoff, S.S.; [Castle, S.L.](#); *JOC*, 2009, 74, 9082-9083. Enantioselective Total Synthesis of (-)-Acutumine.

[Hansen, L.D.](#); Russell, D.J.; *Royal Society of Chemistry*, 2010. Calorimetric Methods for Measuring Heat Capacities of Liquids and Liquid Solutions.

[Hansen, L.D.](#); Criddle, R.S.; Battley, E.H.; *Pure Appl. Chem.*, 2009, 81, 10, 1849-1855. Biological Calorimetry and the Thermodynamics of the Origination and Evolution of Life.

Computer Science

[Jay McCarthy](#) and Shiram Krishnamurthi. "Trusted Multiplexing of Cryptographic Protocols". International Workshop on Formal Aspects in Security and Trust, 2009.

[M. A. Goodrich](#), [B. S. Morse](#), C. Engh, J. L. Cooppear, and J. A. Adams. Towards using Unmanned Aerial Vehicles (UAVs) in Wilderness Search and Rescue: Lessons from field trials. *Interaction Studies*, 10(3), pp455-481, 2009.

C. Tao, [D.W. Embley](#), and S.W. Liddle, {FOCIH}: Form-based Ontology Creation and Information Harvesting, \emph{Proceedings of the 28th International Conference on Conceptual Modeling {ER'09}}, Gramado, Brazil, 9-12 November 2009, 346-359.

"ChemAlign: Biologically Relevant Multiple Sequence Alignment Using Physicochemical Properties", Hyrum Carroll, [Mark Clement](#), [Quinn Snell](#), David McClellan, *Proceedings of the IEEE International Conference on Bioinformatics & Biomedicine (BIBM)*, 2009, pp. 70-73.

"Visualizing Phylogenetic Treespace Using Cartographic Projections", Kenneth Sundberg, [Mark Clement](#), [Quinn Snell](#),

Algorithms in Bioinformatics, Lecture Notes in Computer Science, Springer Berlin / Heidelberg, Volume 5724/2009, Proceedings of the 9th international workshop on Algorithms in Bioinformatics (WABI), Philadelphia, Pennsylvania, September 2009, pp. 321-332.

Geological Sciences

Standley, Carl and [Harris, Ron](#), 2009, Banda forearc basement accreted to the NW Australian continental margin: a geochemical, age and structural analysis of the Lolotai metamorphic complex of East Timor, *Tectonophysics*, v. 479, p. 66-94, doi 10.1016/j.tecto.2009.01.034.

Nugroho, H., [Harris, R.](#), Amin W. L. and Bilal M., 2009, Active plate boundary reorganization in the Banda arc-continent collision: insights from new GPS measurements, *Tectonophysics*, v. 479, p. 52-65, doi 10.1016/j.tecto.2009.01.026.

Roosmawati, Nova and [Harris, Ron](#), 2009, Surface uplift history of the incipient Banda arc-continent collision: geology and synorogenic foraminifera of Rote and Savu Islands, Indonesia, *Tectonophysics*, v. 479, p. 95-110, doi 10.1016/j.tecto.2009.04.009.

Graham, C. R., Burgoyne, N., Cantrell, P., Smith, L., St. Clair, L., & [Harris, R.](#) (2009). TPACK development in science teaching: Measuring the TPACK confidence of inservice science teachers. *TechTrends: Linking Research & Practice to Improve Learning*, 53(5), 70-79.

Mathematics

[Xian-Jin Li](#), 2009. A generalization of A. Connes' trace formula. *Journal of Number Theory* 130, 386-430.

Physics and Astronomy

Ulrich, T.J., Van Den Abeele, K., Le Bas, P.-Y., Griffo, M., [Anderson, B.E.](#), Guyer, R.A., (2009) "Three component time reversal: Focusing vector components using a scalar source," *Journal of Applied Physics*, Vol. 106, 113504.

Statistics

[Johnson, W. E.](#), Liu, J.S., Liu, X.S., (2009). "Doubly-stochastic continuous-time Hidden Markov approach for applications on genome tiling arrays," *Annals of Applied Statistics*, 3:1183-1203.