

BIOGRAPHICAL SKETCH

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NAME: Samuel K. Sia

eRA COMMONS USER NAME (credential, e.g., agency login): samsia

POSITION TITLE: Professor, Biomedical Engineering

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

| INSTITUTION AND LOCATION | DEGREE (if applicable) | Completion Date MM/YYYY | FIELD OF STUDY |
|--|---------------------------|----------------------------|-------------------------|
| University of Alberta (Edmonton, AB, Canada) | B.Sc. | 05/1997 | Biochemistry |
| Harvard University (Cambridge, MA, USA) | Ph.D. | 05/2002 | Biophysics |
| Harvard University (Cambridge, MA, USA) | Postdoc | 05/2005 | Chemistry & Chem. Biol. |

A. Personal Statement

My research group has developed novel technologies for soft microdevices and for point-of-care diagnostics, both in an academic and industry setting (as a founder and chair of scientific advisory board of Claros Diagnostics, a startup company that has recently garnered European regulatory approval for a diagnostics product). Our work in miniaturized medical devices has garnered coverage from over 400 press outlets, including Nature, Science, JAMA, Washington Post, BBC, NPR, Voice of America, Science News, Popular Science, Chemical and Engineering News, and MIT Technology Review. Towards practical translational research, I am also founder of a biotech incubator facility with New York City that has hosted over 40 biotech companies.

B. Positions and HonorsPositions

2016 - Professor, Department of Biomedical Engineering, Columbia University
 2014 - Faculty Co-Director of Entrepreneurship, School of Engineering and Applied Sciences, Columbia University
 2011-2016 Associate Professor, Department of Biomedical Engineering, Columbia University
 2005-2011 - Assistant Professor, Department of Biomedical Engineering, Columbia University

Significant Professional Activities (2010-current)

2018 Chair, NIH Study Section (ZAI1 RB-A)
 2016-2018 Reviewer (DP2, U19, and special-emphasis mechanisms), NIH
 2015 Chair, NIH Study Section (ZAI1 EC-M (S1))
 2015 Keynote speaker, Select Bio Conference (Berlin), 3/18/15
 2014 Invited speaker, EuroLabFocus (Liverpool, England), 10/9/14
 2014 Invited speaker, ESOF EuroScience (Copenhagen, Denmark), 6/25/14
 2014 Invited speaker, AACCC Conference (San Jose, CA), 4/24/14
 2013 Plenary session keynote speaker, 3rd Annual International Conference on Tropical Medicine, Florida International University
 2012 Plenary speaker, NIH/AID International Research in Infectious Diseases Annual Meeting

- 2012 Plenary speaker, ISLH 2012, Nice, France
- 2012 Invited participant, NIH/NHLBI Working Group on Point of Care Technologies for Cardiovascular Clinical Research
- 2012 Invited speaker, NIH/NINR Annual Roundtable
- 2011 External Advisory Board Member, UC Berkeley Center for Neglected Diseases
- 2011 Invited speaker, NIH/NCI, Cancer Diagnostics for Global Health
- 2011 Member, NSF Review Panel (ECCS)
- 2011 Invited speaker, Symposium on innovative approach to infectious-disease diagnostics, Harvard Medical School
- 2011 External Committee Reviewer, NIH/NIAID Western Regional Center of Excellence for Biodefense and Emerging Infectious Diseases Research (Galveston TX)
- 2010 Keynote speaker, Henry Wheeler Center for Emerging and Neglected Diseases, UC Berkeley
- 2010 Featured speaker, MIT Emerging Technologies Conference
- 2010 CDRMP reviewer
- 2010 Member, NSF Review panel (EPDT)
- 2010 Member, organizing committee, National Academy of Engineering Frontiers of Engineering Indo-American Conference (2010)
- 2010 Chair, Northeast Bioengineering Conference (2010)
- 2005- Referee for journals: *Science*, *Nature Materials*, *Nature Chemistry*, *Nature Reviews Drug Discovery*, *Nature Communications*, *Proc. Natl. Acad. Sci.*, *Lab on a Chip*, *Anal. Chem.*, and *others*

Entrepreneurial Activities

- 2013- Co-Founder, Harlem Biospace (biotech incubator started with NYC's Mayor's Office)
- 2009- Founder and President, Junco Labs
- 2004-2011 Co-Founder and Chair of Scientific Advisory Board, Claros Diagnostics (sold in 2011 to OPKO Health, NYSE: OPK). In November 2017, OPKO has filed a Premarket Approval (PMA) application with the U.S. Food and Drug Administration (FDA) for a CLIA-waived Total PSA test with the Claros® 1 immunoassay analyzer. The filing contains clinical data from the Company's 864-patient Total PSA clinical study.
<http://investor.opko.com/news-releases/news-release-details/opko-health-submits-premarket-approval-application-fda-point>

Significant Honors and Awards

- 2016 Inducted Fellow, American Institute for Medical and Biological Engineering (AIMBE)
- 2015 Thiele Lectureship Award, University of Notre Dame
- 2013 Kjeldgaard International Lectures in Molecular Biology, Aarhus Denmark
- 2011 Runner-up, Wall Street Journal Innovation Award in Medical Devices
- 2010 NASA Launch, one of ten innovators in human health and sustainability
- 2010 MIT Technology Review 35 Innovators Under 35
- 2009 Invited attendee, National Academies Keck Futures Initiative, UC Irvine
- 2008-2010 Wallace H. Coulter Early Career Award Phase II
- 2008-2013 NSF CAREER Award
- 2007 Invited participant, National Academy of Engineering Frontiers of Engineering, Seattle
- 2006-2008 Walter H. Coulter Early Career Award
- 2006-2010 American Heart Association Scientist Development Grant
- 2004-2005 Canadian Institutes of Health Research Fellowship (postdoc)
- 2002 Harvard University Certificate of Distinction in Teaching
- 2002 Delegate, International Achievement Summit, Dublin, Ireland (1 of 200 graduate students in the world from all disciplines chosen to attend)
- 1997-2002 Howard Hughes Medical Institute Predoctoral Fellowship

C. Contributions to Science

1. **Medical diagnostic devices.** My lab developed integrated point-of-care diagnostic devices that could detect protein biomarkers from a drop of blood. Our lab was among the first to directly demonstrate that

integrated devices containing lab-on-a-chip technology can be used for this purpose as tested in field settings. Our approach has focused on low-cost manufacturable plastic substrates, and involves collaborators in public health, medicine, and industry. We are now working to develop these devices for infectious diseases, chronic diseases and wellness for global health and consumer health, in combination with consumer electronics devices.

- a. Nayak S, Sridhara A, Melo R, Richer L, Chee NH, Kim J, Linder V, Steinmiller D, Sia SK*, Gomes-Solecki M*, "Microfluidics-based point-of-care test for serodiagnosis of Lyme Disease", **Scientific Reports**, 2016 Oct 11;6:35069. doi: 10.1038/srep35069.
 - b. T. Laksanopin, T.W. Guo, S. Nayak, A.A. Sridhara, S. Xie, O.O. Olowookere, P. Cadinu, F. Meng, N.H. Chee, J. Kim, C.D. Chin, E. Munyazesa, P. Mugwaneza, A.J. Rai, V. Mugisha, A.R. Castro, D. Steinmiller, V. Linder, J.E. Justman, S. Nsanzimana, S.K. Sia, (2015). A smartphone dongle for diagnosis of infectious diseases at the point of care. **Science Translational Medicine**, 7:273re1.
 - c. T. Guo, R. Patnaik, K. Kuhlmann, A.J. Rai, S.K. Sia, "Smartphone dongle for simultaneous measurement of hemoglobin concentration and detection of HIV antibodies", **Lab Chip**, 15:3514-20 (2015).
 - d. C.D. Chin, Y.K. Cheung, T. Laksanasopin, M.M. Modena, S.Y. Chin, A.A. Sridhara, D. Steinmiller, V. Linder, J. Mushingantahe, G. Umviligihozo, E. Karita, L. Mwambarangwe, S.L. Braunstein, J. van de Wiggert, R. Sahabo, J.E. Justman, W. El-Sadr, S.K. Sia, "Mobile device for disease diagnosis and data tracking in resource-limited settings", **Clin. Chem.**, 59, 629-640 (2013).
2. **3D biomaterial microfabrication.** My lab has developed novel high-resolution methods to control the microenvironment around cells. These methods enable precise control over three-dimensional cellular environments. Our lab has used these methods for two sets of applications: engineering tissues with improved function, as well as understanding tissue development to high resolution. We are now working to apply these methods to problems of high clinical significance.
- a. S.Y. Chin, Y.C. Poh, A. Kohler, J.T. Compton, L.L. Hsu, K.M. Lau, S. Kim, B.W. Lee, F.Y. Lee and S.K. Sia, "Additive manufacturing of hydrogel-based materials for next-generation implantable medical devices", **Science Robotics**, eaah6451 (2017).
 - b. N. Tejavibulya and *S.K. Sia, "Personalized Disease Models on a Chip", **Cell Systems**, 3(5):416-418 (2016).
 - c. O. Ordeig, S.Y. Chin, S. Kim, P.V. Chitnis, S.K. Sia, "An implantable compound-releasing capsule triggered on demand by ultrasound", **Scientific Reports**, 6:22803 (2016).
 - d. G. Eng, B.W. Lee, H. Parsa, C.D. Chin, J. Schneider, G. Linkov, S.K. Sia, G. Vunjak-Novakovic, "Assembly of complex cell microenvironments using geometrically docked hydrogel shapes", **Proc. Natl. Acad. Sci.**, 110, 4551-4556 (2013).
3. **Protein design and engineering.** My undergraduate and PhD work focused on using structural biology and protein engineering to develop improved peptide-based inhibitors of viral entry.
- a. S.K. Sia, P.S. Kim. (2003). Protein grafting of an HIV-1 inhibiting epitope. **Proc. Natl. Acad. Sci.**, 100, 9756-9761. PMID: PMC187838.
 - b. S.K. Sia, P.A. Carr, A.G. Cochran, V.N. Malashkevich, P.S. Kim. (2002). Mechanism of short, constrained alpha-helical peptides that inhibit HIV-1 entry. **Proc. Natl. Acad. Sci.**, 99, 14664-14669. (rated by Faculty of 1000 as "must-read" article). PMID: PMC137476

Complete List of Published Work in MyBibliography:

http://www.ncbi.nlm.nih.gov/sites/myncbi/1V_xghsXBqH5X/bibliography/48097030/public/?sort=date&direction=ascending