

SOMPONNAT SAMPATTAVANICH, Ph.D.

Current Position

Instructor, Department of Pharmacology, Faculty of Medicine Siriraj Hospital
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Personal Information

Date of birth: December 28th, 1982 Nationality: Thai Status: Married

Education

- 2005-2011** **Massachusetts Institute of Technology/Harvard Medical School, Cambridge, MA, USA**
Ph.D. in Medical and Electrical Engineering
- Joint program between Harvard Medical School and MIT (HST MEMP Program)
 - Engineering coursework at MIT and clinical curriculum at HMS
- 2005- 2007** **Massachusetts Institute of Technology, Cambridge, MA, USA**
S.M. in Electrical Engineering
- 2002-2005** **Johns Hopkins University, Baltimore, MD, USA**
B.S. in Biomedical Engineering
- Fully supported by the Thai King's Scholarship (national award to top-five Thai highschool students)
 - Graduated in three years with highest departmental honor (Richard J. Johns Award)
- 2001-2002** **Taft School, Watertown, CT, USA**
Post-graduate level
- 1999-2001** **Triam Udom Suksa School, Bangkok, Thailand**
Upper secondary school

Awards

Harvard-MIT Division of Health Sciences and Technology fellowship (2006)
Howard Hughes summer research fellowship, JHU (2004)
Merit award, James F. Lincoln Arc Welding Biomedical Design Competition (2003)
Silver medal, Thailand's National Biology Olympiad (2001)
First Prize, National science quiz contest, Thailand (2000)

Tau Beta Pi, National engineering honor society, member since 2004
Alpha Eta Mu Beta, National biomedical engineering honor society, member since 2004
Golden Key International Honor Society, member since 2003
National Society of Collegiate Scholars, member since 2002

Selected Skills

- Experimental:* High-content microscopy with robot automation (Operetta, ArrayWorx)
Mammalian cell culture (cancer cell lines, human and mouse embryonic stem cells)
Antibody production from hybridoma using CELLLine CL-1000
Gene transduction and silencing (viral infection, RNA interference)
Flow cytometry (analysis, sorting)
RNA and protein expression profiling (qPCR, Western blot, ELISA)
- Computational:* Statistical techniques in high-throughput screening applications: PLSR, PCA, SNE
Strong programming skills in Java, C, C++, Matlab
- Microfluidics:* Extensive experience in developing customized microfluidic platform (AutoCAD, COMSOL)
Strong fabrication skills (photolithography, soft-lithography, oxygen plasma etching, thin film deposition)

Research and Professional Experiences

- 2014-current Co-director, Siriraj Laboratory for Systems Pharmacology, Faculty of Medicine Siriraj Hospital
- Established new drug screening facility, based on high-content imaging technology
 - Teaching responsibility includes topics ranging from new drug development, systems biology, cancer biology and lab-on-a-chip
 - Initiating new curriculum in Systems Pharmacology, launched in 2017
 - Current research interests include single-cell heterogeneity, live biosensors, precision oncology, and point-of-care/companion diagnostics
- 2011-2014 Postdoctoral fellow, Department of System Biology, Harvard Medical School, Boston, MA
Adviser: Peter Sorger, Ph.D.
Project: Investigating heterogeneity of cancer therapeutic responses
- Developed novel FRET-based dual sensor for quantifying the activity of ERK and AKT pathways
 - Systematic profiling of RTK signaling cascades via high-throughput perturbation assays
 - Developed image-processing software for quantitation of signaling proteins
 - Led collaboration on osteoclast differentiation project with Merrimack Pharmaceuticals
- 2005-2011 Graduate research assistant, Research Laboratory of Electronics, MIT, Cambridge, MA
Adviser: Joel Voldman, Ph.D.
Project: A general method for studying autocrine signaling and its impact on cancer cell growth
- Designed techniques to fabricate microarrays of embryonic stem cells and cancer cell lines
 - Developed a novel platform for quantifying autocrine activity in cancer cells
 - Established a method to pattern heterotypic cell arrays using electroactive substrate and stenciling
- 2002-2005 Undergraduate researcher, Department of Biomedical Engineering, John Hopkins University, Baltimore, MD
Adviser: Jennifer Elisseeff, Ph.D.
Project: Instructing chondrogenic differentiation of embryonic stem cells
- Studied effect of 3D microenvironment on differentiation using hydrogel-based cell encapsulation
 - Profiled gene expression changes of co-cultured constructs of embryonic stem cells and excised cartilage during subcutaneous implants in athymic nude mice

Publications

Peer-reviewed articles

Sampattavanich S, Steiert B, Kramer B, Gyori, B, Albeck J, Sorger P (2017) "Encoding growth factor identity in the temporal dynamics of a transcription factor under combinatorial regulation," Submitted.

Laphanuwat P, Likasitwatanakul P, Thaphaengphan A, Chomanee N, Ketaroonrut N, Sittithumcharee G, Charngkaew K, Lam EW, Okada S, Panich U, **Sampattavanich S**, Jirawatnotai S (2017) "Cyclin D1 depletion interferes cancer oxidative balance and sensitizes cancer cell to senescence," Submitted.

Thanuthanakhun N, Nuntakarn L, **Sampattavanich S**, Anurathapan U, Phuphanitcharoenkun S, Pornpaiboonstid S, Borwornpinyo S, Hongeng S (2017) "Investigation of FoxO3 dynamics during erythroblast development in β -thalassemia major," Submitted.

Atwal S, Giengkamb S, Chaemchuenb S, Dorlingc J, VanNieuwenhzed M, Kosaisawe N, **Sampattavanich S**, Schumann P, Salje J "Evidence for a peptidoglycan-like structure in *Orientia tsutsugamushi*," *Molecular Microbiology* doi: 10.1111/mmi.13709.

Jeayeng S, Wongkajornsilp A, Slominski AT, Jirawatnotai S, **Sampattavanich S**, Panich U (2017) "Nrf2 in keratinocytes modulates UVB-induced DNA damage and apoptosis in melanocytes through MAPK signaling," *Free Radic Biol Med*. S0891-5849(17)30580-4 doi: 10.1016/j.freeradbiomed.2017.05.009

Chaiprasongsuk A, Lohakul J, Soontrapa K, **Sampattavanich S**, Akarasereenont P, Panich U (2017) "Activation of Nrf2 reduces UVA-mediated MMP-1 upregulation via MAPK/AP-1 signaling cascades: the photoprotective effects of sulforaphane and hispidulin," *J Pharmacol Exp Ther* 360(3), 388-398.

Chaisiriwong C Wanitphakdeedecha R, Sitthinamsuwan P, **Sampattavanich S**, Chatsiricharoenkul S, Manuskiatti W., Panich U (2016) "A Case-Control Study of Involvement of Oxidative DNA Damage and Alteration of Antioxidant Defense System in Patients with Basal Cell Carcinoma: Modulation by Tumor Removal," *Oxid Med Cell Longev*, 5934024.

Hwang NS, Kim MS, **Sampattavanich S**, Baek JH, Zhang Z, Elisseeff J (2006) “Effects of three-dimensional culture and growth factors on the chondrogenic differentiation of murine embryonic stem cells,” *Stem Cells* 24, 284-291.

Patent

Gurewitsch ED, Ruffner M, Ching KH, **Sampattavanich S**, Ashkon S, Gillian YH(SG), Shangnung HE. “Devices, and methods for bioimpedance measurement of cervical tissue and methods for diagnosis and treatment of human cervix,” International Application WO 04/098389 (JHU Ref 4241).

Conference Papers

Sampattavanich S, Taff B, Desai S, Voldman J (2008) “Organizing complex multicellular constructs using stencil-delineated electroactive patterning,” in *Micro Total Analysis Systems '08*, San Diego, USA.

Hoe YS, Gurewitsch ED, Shaahinfar A, Hu ES, **Sampattavanich S**, Ruffner M, Ching KH, Allen RH (2004) “Measuring bioimpedance in the human uterine cervix,” in *IEEE Proceedings of EMBS*, San Francisco, USA, 2368-2372.

Conference talks

Sampattavanich S, Sorger P (2012) “Determining autocrine addiction in cancer cells: a general method using patterned cell arrays,” presented at *NIGMH National Centers for Systems Biology*, Chicago, USA.

Sampattavanich S, Voldman J (2008) “Examining the effective autocrine length scale using stencil cell patterning,” presented at *BMES Annual Meeting*, St. Louis, USA.

Conference Abstracts

Jamnongsong S, Kueanjinda P, Vaeteewoottacharn K, Okada S, Jirawatnotai S, **Sampattavanich S** (2016) Classification of cholangiocarcinoma cell lines using phenotypic drug response and single-cell proteomic profiling. The 42nd Congress on Science and Technology of Thailand, Bangkok, Thailand.

Sampattavanich S, Niepel M, Vahey M, Sorger P, Voldman J (2010) “Regularly-spaced cell patterns for the examination of diffusive intercellular communication in autocrine systems,” presented at *International Conference on Systems Biology of Human Disease*, Boston, USA.

Sampattavanich S, Voldman J (2008) “Matrix-independent colony patterning to study the influence of colony-colony interactions on stem cell fate decision in murine embryonic stem cells,” presented at *ISSCR Annual Meeting*, Philadelphia, USA.

Sampattavanich S, Voldman J (2007) “System to study colony-colony interactions in murine embryonic stem cells,” presented at *ACS National Meeting*, Boston, USA.

Sampattavanich S, Voldman J (2006) “Matrix-independent cell patterning for studying colony-colony interactions in embryonic stem cells,” presented at *BMES Annual Meeting*, Chicago, USA.