

A selection of publications from the PSOCs is listed below, sorted broadly by category. This list will be coming out more frequently in the future, to enable researchers to keep up with the high-profile findings that are coming from other centers.

General Audience

Physics not biology may be key to beating cancer. Davies P. *New Scientist* 11 January 2013 2898 24-25

<http://www.newscientist.com/article/mg21728970.200-physics-not-biology-may-be-key-to-beating-cancer.html>

Keywords: General audience, policy

The sciences converge to fight cancer. Agus, DB.; Michor, F. *Nature Physics* 8, 773–774 (2012) doi:10.1038/nphys2464

<http://www.nature.com/nphys/journal/v8/n11/full/nphys2464.html>

Keywords: Policy, modeling, computation, mechanics, evolution, genomics, metastasis, drug resistance, general audience

Scripps invents way to spot spread of cancer

<http://www.utsandiego.com/news/2012/feb/02/scripps-research-invents-way-spot-spread-cancer/>

Keywords: General audience, metastasis, clinical

Reviews/Big Picture

The algorithmic origins of life. Walker SI, Davies PCW. *J R Soc Interface J. R. Soc. Interface* 6 February 2013 10(79) 20120869. doi: 10.1098/rsif.2012.0869

<http://dx.doi.org/10.1098/rsif.2012.0869>

Keywords: Evolution, biomathematics, review

Applications of Microfluidics in Stem Cell Biology. Zhang, Q.; Austin, R. *Bionanoscience* 2012, 2(4), 277-286. PMID: 23336098

<http://www.ncbi.nlm.nih.gov/pubmed/23336098>

Keywords: Microfluidics, review, device development

Evolutionary dynamics of carcinogenesis and why targeted therapies don't work. Gillies RJ, Verduzco D, Gatenby RA. *Nat Rev Cancer*. 2012 Jun 14;12(7):487-93. doi: 10.1038/nrc3298

<http://www.ncbi.nlm.nih.gov/pubmed/22695393>

Keywords: Microenvironment, hypoxia, acidosis, evolution, selection, resistance, clinical/biological

Physics of Cancer: The Impact of Heterogeneity. Zhang, Q.; Austin, R. *Annual Review of Condensed Matter Physics* 2012, 3, 363-382. doi: 10.1146/annurev-conmatphys-020911-125109

<http://www.annualreviews.org/doi/abs/10.1146/annurev-conmatphys-020911-125109>

Keywords: Review, evolution, physics, modeling

Biophysics

Hydrophobicity of methylated DNA as a possible mechanism for gene silencing. Kaur, P; Plochberger, B; Costa, P; Cope, SM; Vaiana, SM; Lindsay, S. *Phys. Biol.* 2012; 9(6) 065001. doi: 10.1088/1478-3975/9/6/065001

<http://iopscience.iop.org/1478-3975/9/6/065001/>

Keywords: Epigenetics, DNA methylation, mechanics, gene silencing, biophysics

Luciferase-based protein-denaturation assay for quantification of radiofrequency field-induced targeted hyperthermia: developing an intracellular thermometer. Raof M, Zhu C, Kaluarachchi W, Curley SA. *Int J Hyperthermia* 28(3):202-209, 2012. doi: 10.3109/02656736.2012.666318

<http://www.ncbi.nlm.nih.gov/pubmed/?term=22515341>

Keywords: Clinical therapies, liver cancer, biophysics

Mismatch in mechanical and adhesive properties induces pulsating cancer cell migration in epithelial monolayer. Lee, M.H.; Wu, P.H.; Staunton, J.R.; Ros, R.; Longmore, G.D.; Wirtz, D. *Biophys. J.* 2012, 12, 2731-2741. doi: 10.1016/j.bpj.2012.05.005

<http://www.sciencedirect.com/science/article/pii/S0006349512005577>

Keywords: Mechanical properties, migration, biology, biophysics, breast cancer, metastasis

Physical confinement alters tumor cell adhesion and migration phenotypes. Balzer, E.M.; Tong, Z.; Paul, C.D.; Hung, W.C.; Stroka, K.M.; Boggs, A.E.; Martin, S.S.; Konstantopoulos, K. *FASEB J.* 2012, 10, 4045-4056. doi: 10.1096/fj.12-211441

<http://www.fasebj.org/content/26/10/4045.long>

Keywords: Migration, biophysics, 3D/2D, breast cancer, pancreatic cancer

Spatial-temporal Dynamics of Collective Chemosensing. Sun, B.; Lembong, J.; Normand, V.; Rogers, N.; Stone, H.A. *Proceedings of the National Academy of Sciences* 2012, 109(20), 7759-7764. doi: 10.1073/pnas.1121338109

<http://www.pnas.org/content/109/20/7753>

Keywords: Chemosensing, signaling, microfluidics, biophysics

Cell Biology

Hypoxia-inducible factor 1-dependent expression of platelet-derived growth factor B promotes lymphatic metastasis of hypoxic breast cancer cells. Schito, L.; Rey, S.; Tafani, M.; Zhang, H.; Wong, C.C.; Russo, A.; Russo, M.A.; Semenza, G.L. *PNAS.* 2012, 40, 2707-2716. doi: 10.1073/pnas.1214019109

<http://www.pnas.org/content/109/40/E2707>

Keywords: Cell biology, metastasis, breast cancer, signaling pathways, hypoxia

Implanted Adipose Progenitor Cells As Physicochemical Regulators Of Breast Cancer.

Chandler, EM; Seo, BR ; Califano, JP; Eguiluz, RCA; Lee, JS ; Yoon, CJ; Tims, DT; Wang, JX; Cheng, Mohanan, S; Buckley, MR; Cohen, I; Nikitin, AY; Williams, RM; Gourdon, D;

Reinhart-King, CA; Fischbach, C. PNAS, 2012, 109(25):9786-91. doi: 10.1073/pnas.1121160109

<http://www.pnas.org/content/109/25/9786>

Keywords: Tissue mechanics, cell biology, differentiation, breast cancer, metastasis, tissue engineering

Total kinetic analysis reveals how combinatorial methylation patterns are established on lysines 27 and 36 of histone H3. Zheng, Y.; Sweet, SM.; Popovic, R.; Martinez-Garcia, E.; Tipton, JD.; Thomas, PM.; Licht, JD.; Kelleher, NL. Proc Natl Acad Sci U S A. 2012 Aug 21;109(34):13549-54. doi: 10.1073/pnas.1205707109

<http://www.pnas.org/content/109/34/13549>

Keywords: Epigenetics, molecular biology, assay development, modeling

A Validated Regulatory Network for Th17 Cell Specification. Ciofani M; Madar A; Galan C; Sellars M; Mace K; Pauli F; Agarwal A; Huang W; Parkurs, CN; Muratet M; Newberry KM; Meadows S; Greenfield A; Yang Y; Jain P; Kirigin FK; Birchmeier C; Wagner EF; Murphy KM; Myers RM; Bonneau R; Littman DR. Cell 2012 151(2): 289-303. doi:10.1016/j.cell.2012.09.016
[http://www.cell.com/abstract/S0092-8674\(12\)01123-3](http://www.cell.com/abstract/S0092-8674(12)01123-3)

Keywords: Transcription factors, genomics, computation, biology, signaling

Computation/Modeling

Discriminating survival outcomes in patients with glioblastoma using a simulation-based, patient-specific response metric. Neal ML, Trister AD, Cloke T, Sodt R, Ahn S, Baldock AL, Bridge CA, Lai A, Cloughesy TF, Mrugala MM, Rockhill JK, Rockne RC, Swanson KR. PLoS One. 2013;8(1):e51951. doi: 10.1371/journal.pone.0051951

<http://www.ncbi.nlm.nih.gov/pubmed/23372647>

Keywords: Glioblastoma, metrics, modeling, clinical

Exploiting evolution to treat drug resistance: combination therapy and the double bind.

Basanta D, Gatenby RA, Anderson AR. Mol Pharm. 2012 Apr 2;9(4):914-21. doi: 10.1021/mp200458e

<http://www.ncbi.nlm.nih.gov/pubmed/22369188>

Keywords: Evolution, resistance, ecology, game theory, modeling, clinical

Integrated intravital microscopy and mathematical modeling to optimize nanotherapeutics delivery to tumors. van de Ven AL, Wu M, Lowengrub J, McDougall SR, Chaplain M, Cristini V, Ferrari M, Frieboes HB. American Institute of Physics (AIP) Advances 2012; 2(1): 011208. doi: 10.1063/1.3699060

http://aipadvances.aip.org/resource/1/aaidbi/v2/i1/p011208_s1

Keywords: Computational modeling, microscopy, drug delivery, nanoparticles

A multiphase model for three-dimensional tumor growth. G. Sciume, S. Shelton, W.G. Gray, C.T. Miller, F. Hussain, M. Ferrari, P. Decuzzi and B.A. Schrefler.. New Journal of Physics 15 (2013) 015005. doi: 10.1088/1367-2630

<http://iopscience.iop.org/1367-2630/15/1/015005/>

Keywords: Computational modeling, biophysics, tissue engineering

Optimality in the development of intestinal crypts. Itzkovitz S, Blat IC, Jacks T, Clevers H, van Oudenaarden A. Cell. 2012 Feb 3;148(3):608-19. doi: 10.1016/j.cell.2011.12.025.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=Optimality+in+the+Development+of+Intestinal+Crypts>

Keywords: Differentiation, systems biology, modeling

Self-organization of domain structures by DNA-loop-extruding enzymes. Alipour E, Marko JF. Nucleic Acids Res. 2012 Dec;40(22):11202-12. doi: 10.1093/nar/gks925

<http://nar.oxfordjournals.org/content/40/22/11202>

Keywords: Modeling, molecular biology

A stochastic Markov chain model to describe lung cancer growth and metastasis. Newton

PK, Mason J, Bethel J, Bazahenova LA, Nieva J, Kuhn P. PLoS One 2012;7:E34637.

doi:10.1371/journal.pone.0034637

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0034637>

Keywords: Metastasis, modeling, lung cancer, modeling, clinical

Device/Assay Development

Direct observation of mammalian cell growth and size regulation. Son S, Tzur A, Weng Y,

Jorgensen P, Kim J, Kirschner MW, Manalis SR. Nat Methods. 2012 Sep;9(9):910-2. doi:

10.1038/nmeth.2133.

<http://www.nature.com/nmeth/journal/v9/n9/full/nmeth.2133.html>

Keywords: Microfluidics, cell cycle, biophysics, instrumentation development

Fluid biopsy in patients with metastatic prostate, pancreatic and breast cancers. Marrinucci

D, Bethel K, Kolatkar A, Lutgen MS, Malchiodi M, Baehring F, Vigh K, Lazar D, Nieva J,

Bazhenova L, Ko AH, Korn, WM, Schram E, Coward M, Yang X, Metzner T, Lamy R, Honnatti

M, Yoshioka C, Kunken J, Petrova Y, Sok D, Nelson D, Kuhn P. Phys Biol 2012;9:016003. doi:

10.1088/1478-3975/9/1/016003

<http://iopscience.iop.org/1478-3975/9/1/016003/>

Keywords: Metastasis, clinical, assay development, prostate cancer, breast cancer, pancreatic cancer.

In Vitro Microvessels For The Study Of Angiogenesis And Thrombosis. Zheng, Y., Chen, J.,

Craven, M., Choi, N.W., Totorica, S., Diaz-Santana, A., Kermanie, P., Hempstead, B.,

Fischbach, C., López, J.A., Stroock, A.D. PNAS 2012. 109 (24): 9342-9347. doi:

10.1073/pnas.1201240109

<http://www.pnas.org/content/109/24/9342>

Keywords: Tissue engineering, microfluidics, angiogenesis, in vitro devices, device development

A map of nucleosome positions in yeast at base-pair resolution. Brogaard, K.; Xi, L.; Wang,

J.; Widom, J. Nature. 2012, 486, 497-501. doi: 10.1038/nature11142

<http://www.nature.com/nature/journal/v486/n7404/full/nature11142.html>

Keywords: Molecular biology, genetics, genome, cell biology, assay development

Measurement of single cell refractive index, dry mass volume, and density using a transillumination microscope. Phillips KG, Jacques SL, MCCarty OJ. Phys Rev Lett. 2012;109:118105. doi: 10.1103/PhysRevLett.109.118105

<http://link.aps.org/doi/10.1103/PhysRevLett.109.118105>

Keywords: Microscopy, device development, physics

Multiplexed mass cytometry profiling of cellular states perturbed by small-molecule regulators. Bodenmiller B, Zunder ER, Finck R, Chen TJ, Savig ES, Bruggner RV, Simonds EF, Bendall SC, Sachs K, Krutzik PO, Nolan GP. Nat Biotechnol. 2012 Sep;30(9):858-67. doi: 10.1038/nbt.2317

<http://www.ncbi.nlm.nih.gov/pubmed/22902532>

Keywords: Instrumentation, biology, screening, signaling, phosphorylation

Real-Time Analysis And Selection Of Methylated DNA By Fluorescence-Activated Single Molecule Sorting In A Nanofluidic Channel. B. R. Cipriany, P. J. Murphy, J. A. Hagarman, A. Cerf, D. R. Latulippe, S. L. Levy, J. J. Benitez, C. P. Tan, J. Topolancik, P. D. Soloway, H. G. Craighead, PNAS 109 (22), 8477-8482 (2012). doi:10.1073/Pnas.1117549109

<http://www.pnas.org/content/109/22/8477>

Keywords: Epigenetics, nanofluidics, microfluidics, device development, sequencing