

CURRICULUM VITAE

Darren R. Tyson, Ph.D.

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EDUCATION AND TRAINING

1998–2003 Postdoctoral training under R. A. Bradshaw, Dept. of Physiology & Biophysics, University of California, Irvine
1995–1998 Ph.D., Cell & Molecular Biology, Saint Louis University (Nicola Partridge, advisor)
1990–1995 M.S.(R), Pathology, Saint Louis University
1986–1990 B.S., Microbiology, University of Illinois at Urbana-Champaign

ACADEMIC POSITIONS

2023– Research Associate Professor, Department of Pharmacology, Vanderbilt University
2020–2023 Research Associate Professor, Department of Biochemistry, Vanderbilt University
2018–2020 Research Assistant Professor, Department of Biochemistry, Vanderbilt University
2008–2017 Research Assistant Professor, Department of Cancer Biology, Vanderbilt University
2003–2008 Assistant Researcher, Department of Urology, University of California, Irvine

HONORS / AWARDS

Ruth L. Kirschstein National Research Service Award, 1999–2002

PROFESSIONAL MEMBERSHIPS

American Association for the Advancement of Science, since 1990
American Association for Cancer Research, since 2003
Association of Cancer Systems Biologists, since 2022

PROFESSIONAL ACTIVITIES

National Cancer Institute Cancer Systems Biology Consortium (CSBC) and Integrated Cancer Biology Program (ICBP)

2018– Co-chair, CSBC/PS–ON Image Analysis Working Group (IAWG)
2022 Organizer, Cell Imaging Hackathon (virtual), CSBC/PS–ON IAWG. Interactive development of computational approaches for extracting information from cancer-related digital images, especially multidimensional fluorescence images of cancer cells.

- 2020 Organizer and Host, Cell Imaging Hackathon (Nashville, TN), CSBC/PS-ON IAWG. Interactive development of computational approaches for extracting information from cancer-related digital images, including time-lapse fluorescence microscopy and multidimensional immunofluorescence images of cancer cells.
- 2012, 2011 Co-chair, ICBP Junior Investigator Meeting Organization Committee
- 2009–11 Member, ICBP Junior Investigator Meeting Organization Committee

Association of Cancer Systems Biologists

- 2022– Board member (web-based communication)

Vanderbilt University

- 2022– Member, Basic Science Mental Health and Wellness Advisory Council
- 2020– Member, Committee on Diversity, Equity and Inclusion in Cancer Biology
- 2019– Director of the Quantitative Systems Biology Center Seminar Series (invite/host local and global speakers for biweekly seminars on applications of systems biology to biomedicine)

Saint Louis University

- 1992 & 1997 Publications Editor, Graduate Student Association
- 1993 & 1994 Vice President, Graduate Student Association
- 1995 & 1997 Member, Board of Graduate Studies
- 1991 Departmental Representative, Graduate Student Association

Meeting Moderator

- June 2022 Systems Biology of Human Disease Meeting, Nashville, TN. Session moderator
- Feb 2019 Single Cell Biology Symposium, Vanderbilt University, Nashville, TN. Session moderator.

Reviewing activity

Ad hoc for the following journals:

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| Analyst | EMBO Molecular Medicine |
| Applied Sciences | European Journal of Neuroscience |
| BMC Biophysics | Frontiers in Oncology |
| BMC Cancer | Frontiers in Systems Biology |
| Bioinformatics | International Journal of Cancer |
| Biomarkers in Medicine | International Journal of Developmental Neuroscience |
| Cancer Epidemiology Biomarkers & Prevention | iScience |
| Cancer Research | Journal of Biological Chemistry |
| Cell Systems | Journal of Neurochemistry |
| Computational and Mathematical Methods in Medicine | Journal of Theoretical Biology |
| Computational and Structural Biotechnology Journal | Journal of Urology |
| Current Aging Science | Life Science Alliance |
| Developmental Cell | Molecular Cell Biology Research Communications |
| EBioMedicine | Molecular & Cellular Proteomics |
| eLife | Molecular Systems Biology |
| | Nature Communications |

Nature Methods
 Nutrients
 Proteomics

Scientific Reports
 Wiley Interdisciplinary Reviews: Systems
 Biology & Medicine

Ad hoc reviewer, US grant agencies:

2005 DoD, Congressionally Directed Research Program, Prostate Cancer
 2023 National Cancer Institute, Metastasis Research Network

Editing Activity

2022– Reviewing Editor, Frontiers in Systems Biology, Mechanistic Modeling
 2022– Reviewing Editor, Frontiers in Oncology, Cell Signaling

Other Professional Activity

2022– Scientific Advisory Board, VRise Therapeutics, Cambridge, MA
 2013 Co-founder, Meratempo, LLC, a company built upon predictive modeling of the dynamics of cancer responses to therapeutics at the single-cell level. Inactive since 2015.
 1999–2004 Consultant, Phage Biotechnology Corp., Irvine, CA
 1999–2004 Consultant, Cardiovascular Biotherapeutics, Las Vegas, NV,

TEACHING ACTIVITIES

Graduate Courses, Vanderbilt University

Term(s)	Role	Course Title	Credit	# Students
Spring 2023	Course director	CANB8347: Cancer Systems Biology	3	8
Fall 2022	Course director	CPBP 8328: Systems Thinking in Biomedicine (seminar course)	1	2
Fall 2022	Course director	CPBP 8306: Practical Data Analysis in Biosciences	3	8
Spring 2022	Course director	CPBP 8328: Systems Thinking in Biomedicine (seminar course)	1	4
Fall 2021	Course co-director, instructor (13 lectures)	CPBP 8329: Practical Quantitative Analyses	3	22
Fall 2021	Course director	CPBP 8328: Systems Thinking in Biomedicine (seminar course)	1	13
Spring 2021	Course director	CPBP 8328: Systems Thinking in Biomedicine (seminar course)	1	2
Spring 2021	Course director, Instructor (8–11 lectures)	IGP 8002 (minimester): Quantitative Systems Biology in Single Cells	1	19
Fall 2020	Course director	CPBP 8328: Systems Thinking in Biomedicine (seminar course)	1	1
Spring 2020	Course director, Instructor (8–11 lectures)	IGP 8002 (minimester): Quantitative Systems Biology in Single Cells	1	12
Spring 2020	Course director	CPBP 8328: Systems Thinking in Biomedicine (seminar course)	1	3
2017–2020	Instructor (3 lectures)	BMIF 6310: (lectures on quantifying single cell heterogeneity)		
Spring 2019	Course director,	IGP 8002 (minimester): Quantitative	1	16

	Instructor (8–11 lectures)	Systems Biology in Single Cells		
Spring 2018	Course director, Instructor (8–11 lectures)	IGP 8002 (minimester): Quantitative Systems Biology in Single Cells	1	20
Spring 2017	Course co-director	CANB 8347: Cancer Systems Biology	3	
Spring 2016	Course co-director	CANB 8347: Cancer Systems Biology	3	
2017–2011 (Spring)	Instructor (3–5 lectures)	CANB 8347: Cancer Systems Biology	3	8–15
2018, 2016, 2014	Instructor (2 lectures)	CPBP 8306: (lectures on quantifying single cell behaviors)		
2016	Instructor (3 lectures)	DBMI 5310: quantifying single cell behaviors,		

UC Irvine, Graduate and Medical Education

Term(s)	Role	Lecture Titles	# Students
2010–2006	Instructor	“Basic Scientific Principles”, “Overview of Cancer Biology”, and “Tissue Engineering of the Urinary Tract”; Educational Lectures for Medical Residents, Department of Urology	8–12
2008, 2005, 2003	Instructor	Mol Biol 208 “Intro to Proteomics”: lecture on proteomic analysis of signal transduction	6–10

Research supervision

1998– Research supervisor to more than 40 undergraduate, graduate and medical students and postdoctoral researchers

Thesis Advisor

2018–2020 Wajiha Khalid, Fisk-Vanderbilt Master’s-to-Ph.D. Bridge program, Fisk University, Master’s student in Biology, September 2018–August 2020. Master’s degree conferred August 15, 2020.

Internship Supervisor

2020 Jérémie Mahrlens, École Normale Supérieure de Lyon (France), Biosciences Master internship, January–July 2020.

Other instruction

1996–1998 Supplemental Instruction Facilitator, Office of Multicultural Affairs, Saint Louis University School of Medicine,

RESEARCH PROGRAM

R50CA243783 (Tyson) Research Specialist in Cancer Systems Biology, National Cancer Institute. This grant provides salary support for a highly productive and broadly trained cancer systems biologist, Dr. Darren Tyson, working within the laboratory of a well-established Unit Director, Dr. Vito Quaranta.
Role: PI, 75% effort (concurrent with other grants).

09/2019–08/2024, \$781,020 (total, including indirects)

U54CA217450 (Quaranta) Phenotype Heterogeneity and Dynamics in Small Cell Lung Cancer (SCLC). Goal: combine experimental and modeling approaches to test the hypothesis that heterogeneous phenotypes and their interaction dynamics form a robust SCLC tumor ecosystem adaptable to perturbations, and that this knowledge can be used to overcome resistance and improve SCLC treatment outcomes. Part of the NCI Consortium of Cancer Systems Biology Centers.

03/01/18-02/28/23, ~\$8,000,000 (total, including indirects)

Role: Key Personnel; effort, ~20–30%

U01CA215845 (Lopez, Quaranta)

Phenotype Transitions in Small Cell Lung Cancer

Goals: i) identify attractors of transcription factor networks that act as sources of phenotypic heterogeneity in SCLC; ii) reprogram SCLC cells to a drug-sensitive state via modulation of signaling pathways that impinge upon transcription factor network attractors.

07/01/17–06/30/22, ~\$2,800,000 (total, including indirects)

Role: Key Personnel; effort, ~20–30%

R01CA186193 (Quaranta, Yankeelov, Rericha)

Quantitative multiscale imaging to optimize cancer treatment strategies

Goal: integrate quantitative in vitro and in vivo imaging measurements to predict the maximum patient tumor response early in the course of oncogene-targeted therapy, in order to enable alternative treatment options that minimize or prevent the emergence of the resistant phenotype.

08/01/14–07/31/20, ~\$2,800,000 (total, including indirects)

Role: Co-Investigator; effort, ~20%

U01CA174706 (Yankeelov, Quaranta, Miga)

Image-driven multi-scale modeling to predict treatment response in breast cancer

Goal: develop tumor forecasting methods that predict response of individual breast cancer patients to neoadjuvant therapy by integrating in vivo advanced quantitative multi-modality imaging data into multiscale biophysical models that predict long-term outcomes of HER2+ breast cancer after a single cycle of targeted neoadjuvant therapy.

06/01/13-08/31/19, ~\$2,300,000 (total, including indirects)

Role: Co-investigator; effort, ~20%

P50CA098131 (Arteaga)

Vanderbilt Breast Cancer SPORE Pilot Project, Phenotypic plasticity and intrinsic drug resistance in breast cancer

2014–2015, \$41,149 (total)

Role: PI

UALC (Tyson)	Uniting Against Lung Cancer, Research Grant Award, Variability of Erlotinib Response in Lung Cancer. 2012–2013, \$100,000 (total) Role: PI, 50% effort
U54CA113007 (Quaranta)	NIH/NCI Multiscale Mathematical Modeling of Cancer Invasion Goal: To encapsulate the critical biological parameters of cancer progression into a mathematical model that can be validated experimentally and that underlies realistic computer simulations of the process of cancer invasion itself. 09/30/04–02/28/15, \$18,392,964 (total, including indirects) Role: Co-Investigator; effort, ~20%
AUA Foundation (Tyson)	American Urologic Association Foundation Grant 2003, \$10,000 Role: PI
F32NS010981	National Institute of Neurological Disorders and Stroke postdoctoral fellowship. Goal: To study the role of autophosphorylation sites on the epidermal growth factor receptor in regulating signal transduction in PC-12 cell line model of neuronal differentiation. 1999–2002, \$111,232 Role: PI

PUBLICATIONS AND PRESENTATIONS

Journal articles, peer reviewed

1. Groves SM, Panchy N, Tyson DR, Harris LA, Quaranta V, Hong T. Involvement of Epithelial-Mesenchymal Transition Genes in Small Cell Lung Cancer Phenotypic Plasticity. *Cancers (Basel)*. 2023; 15(5) 1477. doi:10.3390/cancers15051477. PubMed PMID: 36900269. PMCID: PMC10001072.
2. Groves SM, Ildefonso GV, McAtee CO, Ozawa PMM, Ireland AS, Stauffer PE, Wasdin PT, Huang X, Qiao Y, Lim JS, Bader J, Liu Q, Simmons AJ, Lau KS, Iams WT, Hardin DP, Saff EB, Holmes WR, Tyson DR, Lovly CM, Rathmell JC, Marth G, Sage J, Oliver TG, Weaver AM, Quaranta V. Archetype tasks link intratumoral heterogeneity to plasticity and cancer hallmarks in small cell lung cancer. *Cell Syst*. 2022; 13(9) 690-710.e17. doi:10.1016/j.cels.2022.07.006. PubMed PMID: 35981544. PMCID: PMC9615940.
3. Bergdorf K, Bauer JA, Westover D, Phifer C, Murphy B, Tyson DR, Lee E, Weiss VL. Utilizing Three-Dimensional Culture Methods to Improve High-Throughput Drug Screening in Anaplastic Thyroid Carcinoma. *Cancers (Basel)*. 2022 Apr 07; 14(8) 1855. doi:10.3390/cancers14081855. PubMed PMID: 35454763. PMCID: PMC9031362.
4. Wandishin CM, Robbins CJ, Tyson DR, Harris LA, Quaranta V. Real-time luminescence enables continuous drug-response analysis in adherent and suspension cell lines. *Cancer Biol Ther*. 2022 Dec 31; 23(1) 358-368. doi:10.1080/15384047.2022.2065182. PubMed PMID: 35443861. PMCID: PMC9037430.

5. CSBC/PS-ON Image Analysis Working Group, Vizcarra JC, Burlingame EA, Hug CB, Goltsev Y, White BS, Tyson DR, Sokolov A (2022). A community-based approach to image analysis of cells, tissues and tumors. *Comput Med Imaging Graph.* Jan;95:102013. doi: 10.1016/j.compmedimag.2021.102013. PMID: 34864359
6. Lubbock ALR, Harris LA, Quaranta V, Tyson DR, Lopez CF. Thunor: visualization and analysis of high-throughput dose-response datasets. *Nucleic Acids Res.* 2021 07 02; 49(W1) W633-W640. doi:10.1093/nar/gkab424. PubMed PMID: 34038546. PMCID: PMC8265171.
7. Thomas PL, Groves SM, Zhang YK, Li J, Gonzalez-Ericsson P, Sivagnanam S, Betts CB, Chen HC, Liu Q, Lowe C, Chen H, Boyd KL, Kopparapu PR, Yan Y, Coussens LM, Quaranta V, Tyson DR, Iams W, Lovly CM. Beyond Programmed Death-Ligand 1: B7-H6 Emerges as a Potential Immunotherapy Target in SCLC. *J Thorac Oncol.* 2021 Apr 08; S1556-0864(21)02066. doi:10.1016/j.jtho.2021.03.011. PubMed PMID: 33839362.
8. Hayford CE, Tyson DR, Robbins CJ, Frick PL, Quaranta V, Harris LA. An in vitro model of tumor heterogeneity resolves genetic, epigenetic, and stochastic sources of cell state variability. *PLoS Biol.* 2021 Jun; 19(6) e3000797. doi:10.1371/journal.pbio.3000797. PubMed PMID: 34061819. PMCID: PMC8195356.
9. Rundo L, Tangherloni A, Tyson DR, Betta R, Militello C, Spolaor S, Nobile MS, Besozzi D, Lubbock ALR, Quaranta V, Mauri G, Lopez CF, Cazzaniga P. ACDC: Automated Cell Detection and Counting for Time-Lapse Fluorescence Microscopy. *Appl Sci (Basel).* 2020 Sep 02; 10(18) 6187. doi:10.3390/app10186187. PubMed PMID: 34306736. PMCID: PMC8297459.
10. Wooten DJ, Groves SM, Tyson DR, Liu Q, Lim JS, Albert R, Lopez CF, Sage J, Quaranta V. Systems-level network modeling of Small Cell Lung Cancer subtypes identifies master regulators and destabilizers. *PLoS Comput Biol.* 2019 Oct 31;15(10):e1007343. doi: 10.1371/journal.pcbi.1007343 PMID: 31671086
11. Meyer CT, Wooten DJ, Paudel BB, Bauer J, Hardeman KN, Westover D, Lovly CM, Harris LA, Tyson DR, Quaranta V. Quantifying drug combination synergy along potency and efficacy axes. *Cell Syst.* 2019 Feb 27;8(2):97-108.e16. doi: 10.1016/j.cels.2019.01.003. PMID: 30797775
12. Paudel BB, Harris LA, Hardeman KN, Abugable AA, Hayford CE, Tyson DR, Quaranta V. A Nonquiescent "Idling" Population State in Drug-Treated, BRAF-Mutated Melanoma. *Biophys J.* 2018 Mar 27;114(6):1499-1511. doi: 10.1016/j.bpj.2018.01.016. PMID: 29590606
13. Jones ZW, Leander R, Quaranta V, Harris LA, Tyson DR. A drift-diffusion checkpoint model predicts a highly variable and growth-factor-sensitive portion of the cell cycle G1 phase. *PLoS One.* 2018 Feb 12;13(2):e0192087. doi: 10.1371/journal.pone.0192087 PMID: 29432467
14. McKenna MT, Weis JA, Barnes SL, Tyson DR, Miga MI, Quaranta V, Yankeelov TE. A Predictive Mathematical Modeling Approach for the Study of Doxorubicin Treatment in Triple Negative Breast Cancer. *Sci Rep.* 2017 Jul 18;7(1):5725. doi: 10.1038/s41598-017-05902-z PMID: 28720897

15. Hanker AB, Estrada MV, Bianchini G, Moore PD, Zhao J, Cheng F, Koch JP, Gianni L, Tyson DR, Sánchez V, Rexer BN, Sanders ME, Zhao Z, Stricker TP, Arteaga CL. Extracellular Matrix/Integrin Signaling Promotes Resistance to Combined Inhibition of HER2 and PI3K in HER2+ Breast Cancer. *Cancer Res.* 2017 Jun 15;77(12):3280-3292. doi: 10.1158/0008-5472.CAN-16-2808 PMID: 28396358
16. Hardeman KN, Peng C, Paudel BB, Meyer CT, Luong T, Tyson DR, Young JD, Quaranta V, Fessel JP. Dependence on Glycolysis Sensitizes BRAF-mutated Melanomas for Increased Response to Targeted BRAF Inhibition. *Sci Rep.* 2017 Feb 16;7:42604. doi: 10.1038/srep42604 PMID: 28205616
17. Franco OE, Tyson DR, Konvinse KC, Udyavar AR, Estrada L, Quaranta V, Crawford SE, Hayward SW. Altered TGF- α/β signaling drives cooperation between breast cancer cell populations. *FASEB J.* 2016 Oct;30(10):3441-3452 doi: 10.1096/fj.201500187RR PMID: 27383183
18. Harris LA, Frick PL, Garbett SP, Hardeman KN, Paudel BB, Lopez CF, Quaranta V, Tyson DR. An unbiased metric of antiproliferative drug effect in vitro. *Nat Methods.* 2016 Jun;13(6):497-500. doi: 10.1038/nmeth.3852. PMID: 27135974
19. Frick PL, Paudel BB, Tyson DR, Quaranta V. Quantifying heterogeneity and dynamics of clonal fitness in response to perturbation. *J Cell Physiol.* 2015 Jul;230(7):1403-12. doi: 10.1002/jcp.24888. PMID: 25600161
20. Wirtz ED, Hoshino D, Maldonado AT, Tyson DR, Weaver AM. Response of head and neck squamous cell carcinoma cells carrying PIK3CA mutations to selected targeted therapies. *JAMA Otolaryngol Head Neck Surg.* 2015 Jun;141(6):543-9. doi: 10.1001/jamaoto.2015.0471. PMID: 25855885
21. Leander R, Allen EJ, Garbett SP, Tyson DR, Quaranta V. Derivation and experimental comparison of cell-division probability densities. *J Theor Biol.* 2014 Oct 21;359:129-35. doi: 10.1016/j.jtbi.2014.06.004. PMID: 24931675
22. Hoshino D, Jourquin J, Emmons SW, Miller T, Goldgof M, Costello K, Tyson DR, Brown B, Lu Y, Prasad NK, Zhang B, Mills GB, Yarbrough WG, Quaranta V, Seiki M, Weaver AM. Network analysis of the focal adhesion to invadopodia transition identifies a PI3K-PKC α invasive signaling axis. *Sci Signal.* 2012 Sep 11; 5(241) ra66. doi:10.1126/scisignal.2002964. PubMed PMID: 22969158. PMCID: PMC3583194.
23. Tyson DR, Garbett SP, Frick PL, Quaranta V. Fractional proliferation: a method to deconvolve cell population dynamics from single-cell data. *Nat Methods.* 2012 Sep; 9 923-928. doi:10.1038/nmeth.2138. PubMed PMID: 22886092. PMCID: PMC3459330.
24. Gabriel P, Garbett SP, Quaranta V, Tyson DR, Webb GF. The contribution of age structure to cell population responses to targeted therapeutics. *J Theor Biol.* 2012 Oct 21; 311 19-27. doi:10.1016/j.jtbi.2012.07.001. PubMed PMID: 22796330. PMCID: PMC3592383.
25. Tsunoda T, Ota T, Fujimoto T, Doi K, Tanaka Y, Yoshida Y, Ogawa M, Matsuzaki H, Hamabashiri M, Tyson DR, Kuroki M, Miyamoto S, Shirasawa S. Inhibition of phosphodiesterase-4 (PDE4) activity triggers luminal apoptosis and AKT dephosphorylation in a 3-D colonic-crypt model. *Mol Cancer.* 2012 Jul 25; 11 46. doi:10.1186/1476-4598-11-46. PubMed PMID: 22830422. PMCID: PMC3439292.
26. Kundu AK, Gelman J, Tyson DR. Composite thin film and electrospun biomaterials for urologic tissue reconstruction. *Biotechnol Bioeng.* 2011 Jan; 108(1) 207-215. doi:10.1002/bit.22912. PubMed PMID: 20830673.

27. Quaranta V, Tyson DR, Garbett SP, Weidow B, Harris MP, Georgescu W. Trait variability of cancer cells quantified by high-content automated microscopy of single cells. *Methods Enzymol.* 2009; 467 23-57. doi:10.1016/S0076-6879(09)67002-6. PubMed PMID: 19897088. PMCID: PMC2915824.
28. Finley DS, Calvert VS, Inokuchi J, Lau A, Narula N, Petricoin EF, Zaldivar F, Santos R, Tyson DR*, Ornstein DK*. Periprostatic adipose tissue as a modulator of prostate cancer aggressiveness. *J Urol.* 2009 Oct; 182(4) 1621-1627. doi:10.1016/j.juro.2009.06.015. PubMed PMID: 19683746. (* sharing senior authorship)
29. Finley DS, Calvert VS, Inokuchi J, Lau A, Narula N, Petricoin EF, Zaldivar F, Santos R, Tyson DR*, Ornstein DK*. Periprostatic adipose tissue as a modulator of prostate cancer aggressiveness. *J Urol.* 2009 Oct; 182(4) 1621-1627. doi:10.1016/j.juro.2009.06.015. PubMed PMID: 19683746. (* sharing senior authorship)
30. Gamboa AJ, Santos RT, Sargent ER, Louie MK, Box GN, Sohn KH, Truong H, Lin R, Khosravi A, Santos R, Ornstein DK, Ahlering TE, Tyson DR, Clayman RV, McDougall EM. Long-term impact of a robot assisted laparoscopic prostatectomy mini fellowship training program on postgraduate urological practice patterns. *J Urol.* 2009 Feb; 181(2) 778-782. doi:10.1016/j.juro.2008.10.018. PubMed PMID: 19091351.
31. Inokuchi J, Lau A, Tyson DR**, Ornstein DK*. Loss of annexin A1 disrupts normal prostate glandular structure by inducing autocrine IL-6 signaling. *Carcinogenesis.* 2009 Jul; 30(7) 1082-1088. doi:10.1093/carcin/bgp078. PubMed PMID: 19351789. PMCID: PMC2704280. (* sharing senior authorship, # corresponding author)
32. Inokuchi J, Narula N, Yee DS, Skarecky DW, Lau A, Ornstein DK, Tyson DR#. Annexin A2 positively contributes to the malignant phenotype and secretion of IL-6 in DU145 prostate cancer cells. *Int J Cancer.* 2009 Jan 01; 124(1) 68-74. doi:10.1002/ijc.23928. PubMed PMID: 18924133. (# corresponding author)
33. Shukla D, Box GN, Edwards RA, Tyson DR#. Bone marrow stem cells for urologic tissue engineering. *World J Urol.* 2008 Aug; 26(4) 341-349. doi:10.1007/s00345-008-0311-y. PubMed PMID: 18654786. (# corresponding author)
34. Tyson DR, Ornstein DK. Proteomics of cancer of hormone-dependent tissues. *Adv Exp Med Biol.* 2008; 630 133-147. doi:10.1007/978-0-387-78818-0_9. PubMed PMID: 18637489.
35. Lai, L.-C., Tyson, D. R., Clayman, R. V., and Earthman, J. C. (2008) "Encrustation of nanostructured Ti in a simulated urinary tract environment." *Material Science and Engineering C* 28(3):460-4. doi:10.1016/j.msec.2007.04.019
36. Tyson D. R., Inokuchi, J., Tsunoda, T., Lau, A., and Ornstein, D. K. (2007) "Culture requirements of prostatic epithelial cell lines for acinar morphogenesis and lumen formation in vitro: role of extracellular calcium." *The Prostate* 67(15):1601-13. doi:10.1002/pros.20628 PMID: 17705248
37. Ornstein, D. K. and Tyson, D. R. (2006) "Proteomics-Identification of New Prostate Cancer Biomarkers." *Urologic Oncology* 24(3):231-6. PMID: 16678055
38. Hsiang, C.-H., Tsunoda, T., Whang, Y. E., Tyson, D. R. and Ornstein, D. K. (2006) "The impact of altered annexin I protein levels on apoptosis and signal transduction pathways in prostate cancer cells." *The Prostate* 66(13):1413-1424. doi:10.1002/pros.20457 PMID: 16741918

39. Medzirhadszky, K. F., Darula, Z., Chalkley, R. J., Ball, H., Perlson, E., Fainzilber, M., Greenbaum, D., Bogyo, M., Tyson, D. R., Bradshaw, R. A., and Burlingame, A. L. (2004) O-Sulfonation of serine and threonine - mass spectrometric detection and characterization of a new posttranslational modification in diverse proteins throughout the eukaryotes. *Molecular and Cellular Proteomics* 3(5):429-40. PMID: 14752058
40. Jimenez J. C., Tyson, D. R., Dhar S., Nguyen, T., Hamai, Y., Bradshaw, R. A., and Evans, G. R. D. (2003) "Human Embryonic Kidney Cells (HEK-293): Characterization and Dose Response for Modulated Release of NGF for Nerve Regeneration." *Plastic and Reconstructive Surgery* 113(2):605-10. PMID: 14758223
41. Tyson, D. R., Larkin S., Hamai Y., Bradshaw R. A. (2003) "PC12 cell activation by epidermal growth factor receptor: role of autophosphorylation sites" *International Journal of Developmental Neuroscience* 21(2):63-74. PMID: 12615082
42. Swarthout, J. T., Tyson, D. R., Jefcoat, S. C., Partridge, N. C. (2002) Induction of transcriptional activity of the cyclic adenosine monophosphate response element binding protein by parathyroid hormone and epidermal growth factor in osteoblastic cells. *Journal of Bone and Mineral Research* 17, 1401-1407. PMID: 12162494
43. Bajaj M. S., Tyson D. R., Steer S. A. and Kuppuswamy M. N. (2001) "Role of GATA motifs in tissue factor pathway inhibitor gene expression in malignant cells." *Thrombosis Research* 101(3):203-211 PMID: 11228343
44. Tyson, D. R., Swarthout, J. T. and Partridge N. C. (2002) "Parathyroid hormone induction of transcriptional activity of the cAMP response element binding protein requires the serine 129 site and glycogen synthase kinase-3 activity but not casein kinase II sites." *Endocrinology* 143(2):674-682. PMID: 11796524
45. Selvamurugan N., Pulumati M. R., Tyson D. R. and Partridge N. C. (2000) "Parathyroid hormone regulation of the rat collagenase-3 promoter by protein kinase A-dependent transactivation of core binding factor alpha1." *Journal of Biological Chemistry* 275:5037-5042. PMID: 10671545
46. Tyson, D. R., Swarthout, J. T. and Partridge, N. C. (1999) "Increased Osteoblastic c-fos Expression by Parathyroid Hormone Requires Protein Kinase A Phosphorylation of the Cyclic Adenosine 3',5'-Monophosphate Response Element-Binding Protein at Serine 133" *Endocrinology* 140:1255-1261. PMID: 10067851
47. Koe, R. C., Clohisy, J. C., Tyson, D. R., Pulumati, M. R., Cook, T. F., and Partridge, N. C. (1997) "Parathyroid hormone versus phorbol ester stimulation of activator protein-1 gene family members in rat osteosarcoma cells." *Calcified Tissue International* 61:52-58. PMID: 9192514
48. Tyson, D. R., Kuppuswamy, M. N., Broze, G. J., Jr., Bajaj, S. P. (1993) "Revised DNA sequence of exon 1 and 5' flanking region of the human tissue factor pathway inhibitor gene." *Thrombosis Research* 70:269-273. PMID: 8327992

Journal articles, not peer reviewed

1. Groves SM, Panchy N, Tyson DR, Harris LA, Quaranta V, Hong T. Involvement of epithelial-mesenchymal transition genes in small cell lung cancer phenotypic plasticity. bioRxiv 2022.09.09.507376; doi: <https://doi.org/10.1101/2022.09.09.507376>

2. CSBC/PS-ON Image Analysis Working Group, Vizcarra JC, Burlingame EA, Hug CB, Goltsev Y, White BS, Tyson DR and Sokolov A. 2021 A community-based approach to image analysis of cells, tissues and tumors. bioRxiv, 2021.07.22.451363. doi: 10.1101/2021.07.22.451363
3. Groves SM, Ireland A, Liu Q, Simmons AJ, Lau K, Iams WT, Tyson DR, Lovly CM, Oliver TG and Quaranta V. 2021 Cancer Hallmarks Define a Continuum of Plastic Cell States between Small Cell Lung Cancer Archetypes. bioRxiv, 2021.01.22.427865, doi: 10.1101/2021.01.22.427865
4. Hayford CE, Tyson DR, Robbins CJ, Frick PL, Quaranta V and Harris LA. 2020 A unifying framework disentangles genetic epigenetic and stochastic sources of drug-response variability in an in vitro model of tumor heterogeneity. bioRxiv 2020.06.05.136119, doi: 10.1101/2020.06.05.136119
5. Rundo L, Tangherloni A, Tyson DR, Betta R, Militello C, Spolaor S, Nobile MS, Besozzi D, Lubbock ALR, Quaranta V, Mauri G, Lopez CF and Cazzaniga P. 2020 ACDC: Automated Cell Detection and Counting for Time-lapse Fluorescence Microscopy bioRxiv 2020.07.14.202804, doi: 10.1101/2020.07.14.202804
6. Rupprecht L, Davis JC, Arnold C, Lubbock A, Tyson D, and Bhagwat D. 2019. Ursprung: Provenance for Large-Scale Analytics Environments. In 2019 International Conference on Management of Data (SIGMOD '19), June 30-July 5, 2019, Amsterdam, Netherlands. ACM, New York, NY, USA, 4 pages. doi: 10.1145/3299869.3320235
7. Lubbock ALR, Harris LA, Quaranta V, Tyson DR and Lopez CF. 2019 Visualization and analysis of high-throughput in vitro dose-response datasets with Thunor. bioRxiv 530329, doi: 10.1101/530329
8. Tyson, D. R., & Quaranta, V. (2013). Beyond genetics in personalized cancer treatment: assessing dynamics and heterogeneity of tumor responses. *Personalized Medicine*, 10(3), 221-225.
9. Tyson, D. R. (1995) "Characterization of protein kinase C isoforms present in endothelial cells." Master's Thesis. Saint Louis University.

Books/Chapters in books/proceedings

1. Tyson, D. R. and R. A. Bradshaw (2010). "Transmembrane receptor oligomerization." pp. 379-384 (Chapter 55) in *Handbook of Cell Signaling (Second Edition), Volume 1*. Academic Press. San Diego, CA. doi:10.1016/B978-0-12-374145-5.00055-3
2. Tyson, D. R. and R. A. Bradshaw (2003). "Transmembrane receptor oligomerization." pp. 361-366 (Chapter 65) in *Handbook of Cell Signaling, Volume 1*. Academic Press. San Diego, CA.

Invited Presentations

1. Invited speaker, AACR Annual Meeting Educational Session: Combination Therapeutic Strategies in the Treatment of Lung Cancer. (April 9, 2022; New Orleans, LA) "Finding rational combinations of medical therapies in lung cancer."

2. Invited speaker, Society for Mathematical Biology Minisymposium: Integrating quantitative imaging and mechanistic modeling to characterize tumor growth and therapeutic response. Presentation title, “The many dimensions of anticancer drug response—quantifying cell population dynamics at single-cell resolution using automated live-cell microscopy.” June 17, 2021 (virtual presentation)
3. Invited speaker, Japan Society for the Promotion of Science Core-to-Core Program Establishing International Research Network of Mathematical Oncology. Session title, “Integrated analysis and regulation of cellular diversity.” Presentation title, “Personalized Models of Human Cancer Treatment Response from In Vitro and In Vivo Imaging.” October 26–28, 2020 (virtual presentation)
4. Invited speaker, Computational Approaches to Study Cancer Heterogeneity Workshop, (August 21, 2019; Nashville, TN) “Data Analysis of Time-Resolved Imaging for Proliferation Rates (DATRIPR)”
5. Invited speaker, Quantitative Systems Biology Center, Vanderbilt University, Nashville, TN. (May 5, 2017) “Dynamics of Cancer Cell Therapeutic Response.”
6. Invited speaker, Department of Cancer Biology, Vanderbilt University, Nashville, TN. (March 16, 2016) “Tumor cell heterogeneity: Form and function.”
7. Invited speaker, Integrated Cancer Biology Program Meeting on Cancer Heterogeneity Portland, OR. (November 15, 2014) “Stochasticity of cell fate decisions influences predictions of targeted therapy outcomes based on clonal fitness.”
8. Invited speaker, presentation to Deciphera at Vanderbilt University, Nashville, TN. (November 24, 2014) “Translating anticancer drug efficacy from in vitro to in vivo.”
9. Invited speaker, Uniting Against Lung Cancer Investigator meeting, New York, New York. (November 14, 2013) “Variability of erlotinib response in lung cancer.”
10. Invited speaker, Cancer Imaging Group, Vanderbilt University, Nashville, TN. (February 13, 2013) “Fractional Proliferation: A method to quantify cell proliferation dynamics and heterogeneity using automated fluorescence microscopy.”
11. Invited speaker, Melanoma Working Group, Vanderbilt University, Nashville, TN. (January 8, 2013) “Response and Resistance of Melanoma Harboring B-Raf Mutations to PLX (Plexxikon) Agents.”
12. Invited speaker, Seminar for the NIH-funded Minority Access to Research Careers (MARC) Program, University of Puerto Rico, Humacao, Puerto Rico. (October 19, 2011) “Using systems biology to decode the effects of anticancer smart drugs.”
13. Invited speaker, ICBP Workshop (Interrogating Cancer Resistance to Targeted Therapeutics with Systems Biology), Vanderbilt University, Nashville, TN. (August 22, 2011) “Quantifying dynamics of cancer cell proliferation, quiescence and death”
14. Invited speaker, Computational Cell Biology, Cold Spring Harbor Laboratories, Cold Spring Harbor, NY. (April 1, 2011) “Quantitative analysis of entry into quiescence induced by erlotinib using Extended Temporally Resolved Automated Microscopy.”
15. Invited speaker, AACR/ICBP Cancer Systems Biology Satellite Session, La Jolla, CA. (February 28, 2011) “Three parameter model of single-cell drug response in the ICBP-43 panel”

16. Invited speaker, Mathematical Oncology Workshop, Fields Institute, University of Toronto, Toronto, Ontario, Canada. (March 18, 2010) "An EMG model of cell cycle time variability in cancer developed from large datasets of single-cell measurements"
17. Invited speaker, 7th Annual High Content Analysis Meeting, BD Working Group, San Francisco, CA. (Jan 14, 2010) "Analysis of the Restriction Point in Cancer Cells using High-Throughput Imaging."
18. Invited speaker, Integrated Cancer Biology Program Junior Investigator Meeting, San Francisco, CA. (Oct 12, 2009) "Single-Cell Analysis of Cell Division."
19. Invited speaker, 2nd Annual Oncology Biomarkers Conference, Miami, FL. (Jan 19–20, 2009) "Enhancing the Likelihood of Identifying Clinically Useful Protein-Based Cancer Biomarkers."
20. Inokuchi, J., Wulfschlegel, J.D., Petricoin, E.F., III, Ornstein, D.K., and Tyson, D.R. (April 20, 2009) "PTEN loss contributes to prostate carcinogenesis through Akt-independent mechanisms." American Association for Cancer Research Annual Meeting (poster presentation)
21. Invited speaker, Vanderbilt University, Department of Cancer Biology (June 20, 2008) "Modeling prostate carcinogenesis in vitro: Signal transduction in context."
22. Tyson, D. R., Tsunoda, T., Inokuchi, J., Naito, S. and Ornstein, D. K. (April 2008) "Differential gene expression and ligand-induced signal transduction in three-dimensional prostatic epithelial cell culture" American Urologic Association Annual Meeting (oral presentation of poster)
23. Inokuchi, J., Wulfschlegel, J. D., Jia, Z., Lau, A., Naito, S., Petricoin, E. F. III, Mercola, D. E., Tyson, D. R., and Ornstein, D. K. (April 2008) "Reduced annexin A1 expression contributes to prostate cancer by activation of Akt and induction of IL-6" American Urologic Association Annual Meeting (poster)
24. Tyson, D. R., Tsunoda, T., Inokuchi, J., Naito, S. and Ornstein, D. K. (April 2008) "Differential gene expression and ligand-induced signal transduction in three-dimensional prostatic epithelial cell culture" American Association of Cancer Research Annual Meeting (poster)
25. Tyson, D. R., Inokuchi, J., Wulfschlegel, J. D., Jia, Z., Lau, A., Naito, S., Petricoin, E. F. III, Mercola, D. E. and Ornstein, D. K. (May 2008) "Reduced annexin A1 expression contributes to prostate cancer by activation of Akt and induction of IL-6" American Association of Cancer Research Annual Meeting (poster)
26. Department of Pathology, UC Irvine, "Modeling prostate cancer in vitro: roles of annexin A1 and IL-6." (Feb 27, 2008)
27. Kundu, A. K., Gelman, J., and Tyson D. R. (Oct, 2007) "Design and synthesis of a new biomaterial for urethral tissue reconstruction." Annual Meeting of the Western Section American Urological Association (Poster; awarded prize for Best of Session)
28. UC Irvine Department of Urology Leadership Council, oral presentation, "Federal Funding for Research: Where Does the Money Go?" (Dec 4, 2006)
29. UC Irvine Department of Urology Leadership Council, oral presentation, UC Irvine "Department of Urology: Research and Funding" (Oct 12, 2006)
30. UC Irvine Department of Urology Grand Rounds, presentation, "Urinary Bladder Tissue Engineering." (Sept 26, 2006)

31. Tyson, D. R., Tsunoda, T., Inokuchi, J., Lau, A., Naito, S., Williams, K., Hayward, S. and Ornstein, D. K. (2006) "Development and Characterization of a Three-Dimensional Culture Model of Prostatic Acinar Morphogenesis." Society for Basic Urologic Research Fall Meeting. (Poster)
32. Tsunoda, T., Hsiang, C.-H., Choo, S, Tyson, D. R. and Ornstein, D. K. (2006) "The impact of reduced Annexin I expression on apoptosis and signal transduction in prostate cancer cells." American Association for Cancer Research, Atlanta, GA. (Poster)
33. Tsunoda, T., Lau, A., Inokuchi, J., Mitsuhashi, M., Morishige, N., Jester, J. V., Krasieva, T., Naito, S., Tyson, D. R. and Ornstein, D. K. (2006) "In 3-dimensional culture, reducing Annexin I or II expression in benign prostatic epithelial cells induces formation of a solid cell mass resembling prostate intraepithelial neoplasia (PIN)." American Association for Cancer Research, Atlanta, GA. (Poster)
34. Tsunoda, T., Lau, A., Inokuchi, J., Mitsuhashi, M., Morishige, N., Jester, J. V., Krasieva, T., Naito, S., Tyson, D. R. and Ornstein, D. K. (2006) "Reducing annexin A2 expression in benign prostatic epithelial cells induces a malignant phenotype." American Association for Cancer Research, Washington, D. C. (Poster)
35. Tsunoda, T., Hsiang, C.-H., Choo, S, Tyson, D. R. and Ornstein, D. K. (2005) "The impact of reduced Annexin I expression on apoptosis and signal transduction in prostate cancer cells." Society for Basic Urologic Research, Miami, FL. (Poster)
36. Hsiang, C.-H., Choo, S, Tyson, D. R. and Ornstein, D. K. (2005) "The impact of reduced Annexin I expression on apoptosis and signal transduction in prostate cancer cells." American Association for Cancer Research, Anaheim, CA. (Poster)
37. Ornstein, D. K., Choo, S., Hsiang, C.-H., Markey, J. M., Smitherman, A. B., Mohler, J. L., Whang, Y. E. and Tyson, D. R. (2004) "Expression levels of Annexin I, II and VII in human prostate cancer: the impact on apoptosis and ERK activation." American Urological Association Annual Meeting. San Francisco, CA. (Poster)
38. Tyson, D. R., Thompson, L. M., and Bradshaw, R. A. (2001) "Possible mechanisms of how the mutation within fibroblast growth factor receptor 3 which causes thanatophoric dysplasia type II creates a constitutively active kinase." Keystone Symposia, Signaling Systems: Chemistry, Biology and Pathology. Steamboat Springs, CO. (Poster)
39. Tyson, D. R., Leyden, S. and Bradshaw, R. A. (2000) "Dissecting the importance of the tyrosine autophosphorylation sites of the epidermal growth factor receptor using PC12 cells." Keystone Symposia, Signaling 2000. Keystone, CO. (Poster)
40. Tyson, D. R. and Partridge, N. C. (1998) "Phosphorylation and transactivation of CREB in response to PTH" American Society for Biochemistry and Molecular Biology Fall Symposium - Regulation of Bone Formation. Taos, NM. (Oral Presentation)
41. Tyson, D. R. and Partridge, N. C. (1997) "Stimulation of c-fos expression by parathyroid hormone requires phosphorylation of the cAMP response element binding protein by protein kinase A." 19th Annual Meeting of the American Society for Bone and Mineral Research. (Poster)
42. Pearman, A.T., Pulumati, M.R., Tyson, D.R., and Partridge, N.C. (1996) "Parathyroid hormone stimulates the c-fos promoter through CREB phosphorylation and binding to the major CRE." 76th Annual Meeting of the American Society for Biochemistry and Molecular Biology, 1996. (Poster)

PATENTS

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