Curriculum Vitae of Dr. Aristotelis Tsirigos

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Education

Year	Degree	Field	Institution
1998	B.S.	Electrical & Computer Engineering	National Technical University, Athens, Greece
2001	M.S.	Electrical & Computer Engineering	Cornell University, NY, USA
2006	Ph.D.	Computer Science	New York University, NY, USA

Postdoctoral Training

Year	Field	Mentor	Institution
2006-2008	Computational Biology	Dr. I. Rigoutsos	IBM Research Center, NY, USA

Academic Appointments

Year	Title	Institution
2014-	Associate Professor	New York University School of Medicine, NY, USA

Major Administrative Responsibilities

2014-	Director, Clinical Genomics, NYU School of Medicine, NY, USA
2015-	Director, Applied Bioinformatics Laboratories, NYU School of Medicine, NY, USA

Other Professional Positions and Visiting Appointments

Year	Title	Institution
2008-2014	Research Scientist	IBM Research Center, NY, USA

Honors and Awards

1992-1993	Hellenic Mathematical Society awards
1993-1998	Greek National Scholarships Foundation undergraduate awards
1998-2001	Cornell University graduate student fellowship
2001-2006	NYU graduate student fellowship
2007	IBM Outstanding Technical Achievement Award for the Discovery of the Role of "Junk" DNA
2008	IBM Invention Achievement Award, first Plateau,
2016-2019	American Cancer Society, Research Scholar Grant
2016-2017	Leukemia & Lymphoma Society, New Idea Award

Major Committee Assignments

2015	Member of the NYU Molecular Profiling Committee
2015-	Member of the NYU Graduate Admissions Committee
2016-	Member of the NYU Medical Center Basic Science Research IT Steering Committee
2016-	Member of the High-Performance Computing Committee

Memberships, Offices and Committee Assignments in Professional Societies

American Association for Cancer Research (AACR)

International Society for Computational Biology (ISCB)
American Association for the Advancement of Science (AAAS)
Hellenic Bioscientific Association (HBA)

Teaching Experience

2014-2015	"Introduction to Computational Genomics": lecture for Translating Cancer Discovery into Clinical Practice course, NYU School of Medicine
2015	"Introduction to Computational Epigenomics": lecture for Molecular Pathology in the Omics Era course, NYU School of Medicine
2015	"Introduction to Hi-C": lecture series for Bioinformatics Foundations I course, NYU School of Medicine
2016	"Introduction to Chromatin Organization": lecture for Molecular Pathology in the Omics Era course, NYU School of Medicine
2016	"Introduction to Chromatin Organization": lecture series for Topics in Bioinformatics course, NYU School of Medicine

Mentoring of Graduate Students, Residents, Post-doctoral Fellows, Core Members

Direct supervision

2010-2014	Erhan Bilal, post-doctoral fellow
2010-2015	Thomas Trimarchi, graduate student
2014-	Yixiao Gong, bioinformatics analyst
2014-	Charalampos Lazaris, graduate student
2015-	Betul Akgol, bioinformatics analyst (Applied Bioinformatics Laboratories)
2015-	Tenzin Lhakhang, bioinformatics analyst (Applied Bioinformatics Laboratories)
2015-	Stephen Kelly, bioinformatics analyst (Applied Bioinformatics Laboratories)
2015-	Igor Dolgalev, graduate student
2016-	Alireza Khodadadi, bioinformatics analyst (Applied Bioinformatics Laboratories)
2016-	Menghan Liu, graduate student
2016-	Sofia Nomikou, graduate student
2016-	Andreas Kloetgen, post-doctoral fellow

Committee member

2015-	Sameer Aryal, graduate student
2015-	Kaitlyn Reinhold, graduate student
2016-	Zuojian Tang, graduate student
2016-	Nan Zhang, graduate student

Major Research Interests

1. Cancer Epigenetics & Chromatin Organization in Cancer
2. Non-coding DNA & RNA in Cancer
3. Standardizing Computational Methods

Grants Received

7/2013 - 6/2015	Sidney Kimmel Foundation for Cancer Research, SKF-13-128 (effort 10%; PI: Stadtfeld)
12/2013 - 11/2018	NIH/NCI, R01 CA181111 (effort 5%; PI: Schober; $207,500 per year)
7/2014 - 6/2019	NIH, 1R01GM111852-02 (effort 7%; PI: Stadtfeld; $195,253 per year)
5/2015 - 3/2020	NIH, 1R01CA194923-01 (effort 10%; PI: Aifantis; $329,360 per year)
1/2016 - 12/2019	American Cancer Society, Research Scholar Grant (**PI: Tsirigos**; $165,000 per year)
10/2016 - 9/2017	Leukemia & Lymphoma Society, New Idea Award (**PI: Tsirigos**; $75,000)

Patents

1. **Tsirigos A**, Rigoutsos I. Apparatus, machine-readable medium, and system for the detection of atypical sequences via generalized compositional methods, US Patent 7,613,662, November 2009.
2. **Tsirigos A**, Rigoutsos I. Method for the detection of atypical sequences via generalized compositional methods, US Patent 7,962,427, June 2011.
3. Rigoutsos I, Hyunh T, **Tsirigos A**, McHardy AC, Miranda KC. Techniques for linking non-coding and gene-coding deoxyribonucleic acid sequences and applications thereof, US Patent 8,065,091, November 2011.
4. Rigoutsos I, Hyunh T, **Tsirigos A**, McHardy AC. Ribonucleic acid interference molecules and binding sites derived by analyzing intergenic and intronic regions of genomes, US Patent 8,178,503, May 2012.

Invited Seminars and Lectures

1. **Tsirigos A**. Non-conserved intronic motifs are related to piRNAs and linked to a conserved set of functions in human and mouse. Invited talk, MicroRNAs Europe 2007 Meeting, University of Cambridge, Cambridge, UK, November 2007.
2. **Tsirigos A**. Non-conserved intronic motifs in human and mouse are associated with a conserved set of functions. Invited talk, Cornell Medical College, Department of Hematology-Oncology, April 2008.
3. **Tsirigos A**. Next-generation sequencing analysis for cancer genomics. Invited talk, Gachon University, Lee Gil Ya Cancer and Diabetes Institute, April 2010.
4. **Tsirigos A**. Evidence for convergent evolution of ALU repeats in human and mouse. Invited talk, Columbia University, Center for Computational Biology and Bioinformatics, May 2010.
5. **Tsirigos A**. Assessing data and sourcing new targets. Invited talk, Tumor Microenvironment meeting, Boston, October 2012.
6. **Tsirigos A**. Characterization of Notch1-dependent epigenetic transformation in T cell acute lymphoblastic leukemia. Invited talk, Mount Sinai, March 2012.
7. **Tsirigos A**. Hypothesis generation via epigenomics and transcriptomics data integration. Invited talk, UCLA Medical School, April 2013.
8. **Tsirigos A**. Characterization of Notch1-dependent epigenetic transformation in T cell acute lymphoblastic leukemia. Invited talk, Memorial Sloan-Kettering Cancer Center, April 2013.
9. **Tsirigos A**. Hypothesis generation via epigenomics and transcriptomics data integration. Invited talk, NYU Medical Center, May 2013.
10. **Tsirigos A**. Characterization of aberrant histone modification patterns in T cell leukemia. Invited talk, National Technical University of Athens, Greece, November 2014.
11. **Tsirigos A**. Characterization of aberrant histone modification patterns in T cell leukemia. Invited talk, Cornell Medical Center, December 2014.
12. **Tsirigos A**. Characterization of aberrant histone modification patterns in T cell leukemia. Keynote talk, Compute Ontario Research Day, May 2015.
13. **Tsirigos A**. Characterization of chromatin organization disruptions in leukemia, Technical University of Munich, Germany.

Military Service

5/2008-7/2008 Greek Air Force

Other

1995 Diploma in classical guitar (mentor: I. Mavreas); Public Conservatory of Music, Kalamata, Greece

Bibliography

Original Reports

1. **Tsirigos A**, Haas Z **(2004)**. Analysis of multipath routing, part 1: The effect on the packet delivery ratio. **IEEE Transactions on Wireless Communications**, January 2004.
2. **Tsirigos A**, Haas Z **(2004)**. Analysis of multipath routing, part 2: mitigation of the effects of frequently changing network topologies. **IEEE Transactions on Wireless Communications**, March 2004.
3. **Tsirigos A**, Rigoutsos I **(2005)**. A new computational method for the detection of horizontal gene transfer events. **Nucleic Acids Res**. 2005 Feb 16;33(3):922-33. Print 2005.
4. **Tsirigos A**, Rigoutsos I **(2005)**. A sensitive, support-vector-machine method for the detection of horizontal gene transfers in viral, archaeal and bacterial genomes. **Nucleic Acids Res**. 2005 Jul 8;33(12):3699-707. Print 2005.
5. Rigoutsos I, Huynh T, Miranda K, **Tsirigos A**, McHardy A, Platt D **(2006)**. Short blocks from the noncoding parts of the human genome have instances within nearly all known genes and relate to biological processes. **Proc Natl Acad Sci U S A**. 2006 Apr 25;103(17):6605-10. Epub 2006 Apr 24.
6. McHardy AC, Martín HG, **Tsirigos A**, Hugenholtz P, Rigoutsos I **(2006)**. Accurate phylogenetic classification of variable-length DNA fragments. **Nat Methods**. 2007 Jan;4(1):63-72. Epub 2006 Dec 10.
7. **Tsirigos A**, Rigoutsos I **(2008)**. Human and mouse introns are linked to the same processes and functions through each genome's most frequent non-conserved motifs. **Nucleic Acids Res**. 2008 Jun;36(10):3484-93. Epub 2008 May 1.
8. Ochoa-Espinosa A, Yu D, **Tsirigos A**, Struffi P, Small S **(2009)**. Anterior-posterior positional information in the absence of a strong Bicoid gradient. **Proc Natl Acad Sci U S A**. 2009 Mar 10;106(10):3823-8. Epub 2009 Feb 23.
9. Weiss A, Charbonnier E, Ellertsdóttir E, **Tsirigos A**, Wolf C, Schuh R, Pyrowolakis G, Affolter M **(2009)**. A conserved activation element in BMP signaling during Drosophila development. **Nat Struct Mol Biol**. 2010 Jan;17(1):69-76. Epub 2009 Dec 13.
10. **Tsirigos A***, Rigoutsos I* **(2009)**. Alu and B1 repeats have been selectively retained in the upstream and intronic regions of genes of specific functional classes. **PLoS Comput Biol**. 2009 Dec;5(12):e1000610. Epub 2009 Dec 18 (***co-corresponding author)**.
11. Laurent L, Wong E, Li G, Huynh T, **Tsirigos A**, Ong CT, Low HM, Kin Sung KW, Rigoutsos I, Loring J, Wei CL **(2010)**. Dynamic changes in the human methylome during differentiation. **Genome Res**. 2010 Mar;20(3):320-31. Epub 2010 Feb 4.
12. Pavlides S[1], **Tsirigos A[1]**, Vera I, Flomenberg N, Frank PG, Casimiro MC, Wang C, Pestell RG, Martinez-Outschoorn UE, Howell A, Sotgia F, Lisanti MP **(2010)**. Transcriptional evidence for the "Reverse Warburg Effect" in human breast cancer tumor stroma and metastasis: similarities with oxidative stress, inflammation, Alzheimer's disease, and "Neuron-Glia Metabolic Coupling". **Aging** (Albany NY). 2010 Apr;2(4):185-99 **([1]co-first author)**.
13. Pavlides S, **Tsirigos A**, Vera I, Flomenberg N, Frank PG, Casimiro MC, Wang C, Fortina P, Addya S, Pestell RG, Martinez-Outschoorn UE, Sotgia F, Lisanti MP **(2010)**. Loss of stromal caveolin-1 leads to oxidative stress, mimics hypoxia and drives inflammation in the tumor microenvironment, conferring the "reverse Warburg effect": a transcriptional informatics analysis with validation. **Cell Cycle**. 2010 Jun 1;9(11):2201-19.
14. Migneco G, Whitaker-Menezes D, Chiavarina B, Castello-Cros R, Pavlides S, Pestell RG, Fatatis A, Flomenberg N, **Tsirigos A**, Howell A, Martinez-Outschoorn UE, Sotgia F, Lisanti MP **(2010)**. Glycolytic cancer associated fibroblasts promote breast cancer tumor growth, without a measurable increase in angiogenesis: evidence for stromal-epithelial metabolic coupling. **Cell Cycle**. 2010 Jun 15;9(12):2412-22. Epub 2010 Jun 15.
15. Bonuccelli G, **Tsirigos A**, Whitaker-Menezes D, Pavlides S, Pestell RG, Chiavarina B, Frank PG, Flomenberg N, Howell A, Martinez-Outschoorn UE, Sotgia F, Lisanti MP **(2010)**. Ketones and lactate "fuel" tumor growth

and metastasis: Evidence that epithelial cancer cells use oxidative mitochondrial metabolism. **Cell Cycle**. 2010 Sep 1;9(17):3506-14. Epub 2010 Sep 21.

16. Lisanti MP, Martinez-Outschoorn UE, Chiavarina B, Pavlides S, Whitaker-Menezes D, **Tsirigos A**, Witkiewicz A, Lin Z, Balliet R, Howell A, Sotgia F **(2010)**. Understanding the "lethal" drivers of tumor-stroma co-evolution: emerging role(s) for hypoxia, oxidative stress and autophagy/mitophagy in the tumor micro-environment. **Cancer Biol Ther**. 2010 Sep;10(6):537-42.
17. Pavlides S, **Tsirigos A**, Migneco G, Whitaker-Menezes D, Chiavarina B, Flomenberg N, Frank PG, Casimiro MC, Wang C, Pestell RG, Martinez-Outschoorn UE, Howell A, Sotgia F, Lisanti MP **(2010)**. The autophagic tumor stroma model of cancer: Role of oxidative stress and ketone production in fueling tumor cell metabolism. **Cell Cycle**. 2010 Sep 1;9(17):3485-505.
18. Rossi S[1], **Tsirigos A[1]**, Amoroso A, Mascellani N, Rigoutsos I, Calin GA, Volinia S **(2010)**. OMiR: Identification of associations between OMIM diseases and microRNAs. **Genomics**. 2011 Feb;97(2):71-6. Epub 2010 Oct 23 **([1]co-first author)**.
19. Martinez-Outschoorn UE, Whitaker-Menezes D, Pavlides S, Chiavarina B, Bonuccelli G, Casey T, **Tsirigos A**, Migneco G, Witkiewicz A, Balliet R, Mercier I, Wang C, Flomenberg N, Howell A, Lin Z, Caro J, Pestell RG, Sotgia F, Lisanti MP **(2010)**. The autophagic tumor stroma model of cancer or "battery-operated tumor growth": A simple solution to the autophagy paradox. **Cell Cycle**. 2010 Nov 1.
20. Martinez-Outschoorn UE, Prisco M, Ertel A, **Tsirigos A**, Lin Z, Pavlides S, Wang C, Flomenberg N, Knudsen ES, Howell A, Pestell RG, Sotgia F, Lisanti MP **(2011)**. Ketones and lactate increase cancer cell "stemness," driving recurrence, metastasis and poor clinical outcome in breast cancer: achieving personalized medicine via Metabolo-Genomics. **Cell Cycle**. 2011 Apr 15;10(8):1271-86.
21. Witkiewicz AK, Kline J, Queenan M, Brody JR, **Tsirigos A**, Bilal E, Pavlides S, Ertel A, Sotgia F, Lisanti MP **(2011)**. Molecular profiling of a lethal tumor microenvironment, as defined by stromal caveolin-1 status in breast cancers. **Cell Cycle**. 2011 Jun 1;10(11):1794-809. Epub 2011 Jun 1.
22. **Tsirigos A***, Haiminen N, Bilal E, Utro F **(2011)**. GenomicTools: a computational platform for developing high-throughput analytics in genomics. **Bioinformatics**. 2011 Nov 22 **(*corresponding author)**.
23. Whitaker-Menezes D, Martinez-Outschoorn UE, Flomenberg N, Birbe RC, Witkiewicz AK, Howell A, Pavlides S, **Tsirigos A**, Ertel A, Pestell RG, Broda P, Minetti C, Lisanti MP, Sotgia F **(2011)**. Hyperactivation of oxidative mitochondrial metabolism in epithelial cancer cells in situ: Visualizing the therapeutic effects of metformin in tumor tissue. **Cell Cycle**. 2011 Dec 1;10(23).
24. Ertel A, **Tsirigos A**, Whitaker-Menezes D, Birbe RC, Pavlides S, Martinez-Outschoorn UE, Pestell RG, Howell A, Sotgia F, Lisanti MP **(2012)**. Is cancer in a metabolic rebellion against host aging? In the quest for immortality, tumor cells try to save themselves by boosting mitochondrial metabolism. **Cell Cycle**. 2012 Jan 15;11(2).
25. Ntziachristos P[1], **Tsirigos A[1,*]**, et al. **(2012)**. Genetic Inactivation of the PRC2 Complex in T-Cell Acute Lymphoblastic Leukemia. **Nature Medicine**. 2012 Jan 11 **([1]co-first author, *co-corresponding author)**.
26. Capparelli C, Guido C, Whitaker-Menezes D, Bonuccelli G, Balliet R, Pestell TG, Goldberg AF, Pestell RG, Howell A, Sneddon S, Birbe R, **Tsirigos A**, Martinez-Outschoorn U, Sotgia F, Lisanti MP **(2012)**. Autophagy and senescence in cancer-associated fibroblasts metabolically supports tumor growth and metastasis, via glycolysis and ketone production. **Cell Cycle**, 2012 Jun 15;11(12).
27. Bonuccelli G, Castello-Cros R, Capozza F, Martinez-Outschoorn UE, Lin Z, **Tsirigos A**, Xuanmao J, Whitaker-Menezes D, Howell A, Lisanti MP, Sotgia F **(2012)**. The milk protein α-casein functions as a tumor suppressor via activation of STAT1 signaling, effectively preventing breast cancer tumor growth and metastasis. **Cell Cycle**. 2012 Nov 1;11(21)
28. Sotgia F, Whitaker-Menezes D, Martinez-Outschoorn UE, Salem AF, **Tsirigos A**, Lamb R, Sneddon S, Hulit J, Howell A, Lisanti MP **(2012)**. Mitochondria "fuel" breast cancer metabolism: fifteen markers of mitochondrial biogenesis label epithelial cancer cells, but are excluded from adjacent stromal cells. **Cell Cycle**. 2012 Dec 1;11(23):4390-401.
29. Lisanti MP, **Tsirigos A**, Pavlides S, Reeves KJ, Peiris-Pagès M, Chadwick AL, Sanchez-Alvarez R, Lamb R, Howell A, Martinez-Outschoorn UE, Sotgia F **(2014)**. JNK1 stress signaling is hyper-activated in high breast

density and the tumor stroma: connecting fibrosis, inflammation, and stemness for cancer prevention. **Cell Cycle**, 2014 Feb 15;13(4):580-99.

30. Siegle JM, Basin A, Sastre-Perona A, Yonekubo Y, Brown J, Sennett R, Rendl M, **Tsirigos A**, Carucci JA, Schober M **(2014)**. SOX2 is a cancer-specific regulator of tumour initiating potential in cutaneous squamous cell carcinoma. **Nature Communications**, 2014 Jul 31.
31. Trimarchi T, Bilal E, Ntziachristos P, Fabbri G, Dalla-Favera R, **Tsirigos A*** and Aifantis I* **(2014)**. Genome-wide mapping and characterization of novel Notch-regulated long non-coding RNAs in acute leukemia. **Cell**, Jul 31 **(*co-corresponding author)**.
32. Ntziachristos P, **Tsirigos A[1,]***, et al **(2014)**. Contrasting roles for histone 3 lysine 27 demethylases in acute lymphoblastic leukemia. **Nature**, 2014 Aug 17 (**[1]co-first author, *co-corresponding author**).
33. Di Micco R*, Fontanals-Cirera B, Low V, Ntziachristos P, Yuen SK, Lovell CD, Dolgalev I, Yonekubo Y, Zhang G, Rusinova E, Gerona-Navarro G, Cañamero M, Ohlmeyer M, Aifantis I, Zhou MM, **Tsirigos A***, Hernando E* **(2014)**. Control of Embryonic Stem Cell Identity by BRD4-Dependent Transcriptional Elongation of Super-Enhancer-Associated Pluripotency Genes. **Cell Reports**, 2014 Sep 24 **(*co-corresponding author)**.
34. Vidal SE, Amlani B, Chen T, **Tsirigos A**, Stadtfeld M **(2014)**. Combinatorial Modulation of Signaling Pathways Reveals Cell-Type-Specific Requirements for Highly Efficient and Synchronous iPSC Reprogramming. **Stem Cell Reports**. 2014 Oct 14;3(4):574-84. PMID: 25358786
35. Kourtis N, Moubarak RS, Aranda-Orgilles B, Lui K, Aydin IT, Trimarchi T, Darvishian F, Salvaggio C, Zhong J, Bhatt K, Chen EI, Celebi JT, Lazaris C, **Tsirigos A**, Osman I, Hernando E, Aifantis I **(2015)**. FBXW7 modulates cellular stress response and metastatic potential through HSF1 post-translational modification. **Nature Cell Biology**. 2015 Mar;17(3):322-32. PMID: 25720964
36. Pitt LA, Tikhonova AN, Hu H, Trimarchi T, King B, Gong Y, Sanchez-Martin M, **Tsirigos A**, Littman DR, Ferrando AA, Morrison SJ, Fooksman DR, Aifantis I, Schwab SR **(2015)**. CXCL12-Producing Vascular Endothelial Niches Control Acute T Cell Leukemia Maintenance. **Cancer Cell**. 2015 Jun 8;27(6):755-68. PMID: 26058075
37. Mullenders J, Aranda-Orgilles B, Lhoumaud P, Keller M, Pae J, Wang K, Kayembe C, Rocha PP, Raviram R, Gong Y, Premsrirut PK, **Tsirigos A**, Bonneau R, Skok JA, Cimmino L, Hoehn D, Aifantis I **(2015)**. Cohesin loss alters adult hematopoietic stem cell homeostasis, leading to myeloproliferative neoplasms. **J Exp Med**. 2015 Oct 19;212(11):1833-50. PMID: 26438359
38. Aranda-Orgilles B, Saldaña-Meyer R, Wang E, Trompouki E, Fassl A, Lau S, Mullenders J, Rocha PP, Raviram R, Guillamot M, Sánchez-Díaz M, Wang K, Kayembe C, Zhang N, Amoasii L, Choudhuri A, Skok JA, Schober M, Reinberg D, Sicinski P, Schrewe H, **Tsirigos A**, Zon LI, Aifantis I **(2016)**. MED12 Regulates HSC-Specific Enhancers Independently of Mediator Kinase Activity to Control Hematopoiesis. **Cell Stem Cell**. 2016 Aug 24. pii: S1934-5909(16)30251-X. PMID: 27570068
39. Strikoudis A, Lazaris C, Trimarchi T, Galvao Neto A, Yang Y, Ntziachristos P, Rothbart S, Buckley S, Dolgalev I, Stadtfeld M, Strahl BD, Dynlacht BD, **Tsirigos A*** and Aifantis I* **(2016)**. Regulation of transcriptional elongation in pluripotency and cell differentiation by the PHD-finger protein Phf5a. **Nature Cell Biology**, 2016 Nov;18(11):1127-1138. doi: 10.1038/ncb3424. PMID: 27749823 **(*co-corresponding author)**.
40. Gutiérrez GD, Bender AS, Cirulli V, Mastracci TL, Kelly SM, **Tsirigos A**, Kaestner KH, Sussel L **(2016)**. Pancreatic β cell identity requires continual repression of non-β cell programs. **J Clin Invest.** 2016 Dec 12. pii: 88017. doi: 10.1172/JCI88017.
41. Lazaris C, Kelly S, Ntziachristos P, Aifantis I*, **Tsirigos A* (2017)**. HiC-bench: comprehensive and reproducible Hi-C data analysis designed for parameter exploration and benchmarking. **BMC Genomics,** 2017 Jan 5;18(1):22. doi: 10.1186/s12864-016-3387-6 **(*co-corresponding author)**.

Reviews, Books and Book Chapters

1. **Tsirigos A** and Rigoutsos I. MicroRNA Target Prediction, in "MicroRNAs in Development and Cancer", Imperial College Press, edited by F. Slack, October 2010.
2. **Tsirigos A**, Haiminen N, Bilal E, Utro F. GenomicTools: an open-source platform for developing high-throughput analytics in genomics, in "Open source software in life science research: Practical solutions to common challenges in the pharmaceutical industry and beyond", Woodhead Publishing Series in Biomedicine, edited by L. Harland and M. Foster, November 2012.