

BIOGRAPHICAL SKETCH

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NAME: Dinov, Ivo

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POSITION TITLE: Henry P. Tappan Collegiate Professor

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)	END DATE MM/YYYY	FIELD OF STUDY
University of Sofia, Sofia	BS	06/1991	Mathematics
Michigan Technological University, Houghton, MI	MS	06/1993	Mathematics
Florida State University, Tallahassee, FL	MS	04/1998	Statistics
Florida State University, Tallahassee, FL	PHD	04/1998	Mathematics
UCLA, Los Angeles, CA	Postdoctoral Fellow	06/2000	T32 Computational Neuroscience Fellow

A. Personal Statement

I am the Henry Philip Tappan Collegiate Professor at the University of Michigan (UM), Schools of Nursing and Medicine, and Chair of the department of Systems, Populations and Leadership. My research is directed toward the development of advanced mathematical models for representation, scientific computing, statistical inference, and interactive visualization of multi-dimensional, multimodal, multisource, and time-varying biomedical and health data. I work on several complementary NIH- and NSF-funded projects that include modeling, manipulation, longitudinal analysis, and understanding of heterogeneous Big Data in healthy and pathological populations. I direct the Statistics Online Computational Resource (SOCR), which provides interactive Internet-based resources for data science, statistical computing, predictive analytics, and artificial intelligence capabilities. As co-Director of the multi-institutional Probability Distributome project, I coordinate a network of blended instructional resources on probability and statistics education. I have led several innovative software development projects (statistical computing, graphical Pipeline workflows, BioSiteMaps, Distributome) that are widely utilized by the general scientific community. I direct the Center for Complexity and Self-management of Chronic Disease (CSCD). My scholarship, research developments, and scientific discovery efforts interface mathematical foundations of data sciences, the theory of spacetime analytics, as well as transdisciplinary education and training in big data management, mathematical modeling, computational processing, data interrogation, statistical inference, artificial intelligence, and scientific visualization. I have completed mentor training (Mentor Training for Clinical and Translational Researchers from the University of Wisconsin-Madison's Center for the Improvement of Mentored Experiences in Research), Collaborative research training (CITI Collaborative Institutional Training Initiative), training in regulatory and responsible conduct of research (Program for Education and Evaluation in Responsible Research and Scholarship, PEERRS), Michigan research administration training, and DEI training (Michigan Diversity, Equity & Inclusion course). I direct the Michigan Biomedical Informatics and Data Science predoctoral Training Program (BIDS-TP). Ongoing and recently completed projects that I would like to highlight include: T32 GM141746, Dinov / Mills, Role: (MPI) 07/01/21 – 6/30/26 To enhance their scientific, clinical, and translational abilities, all biomedical informatics and data science training program (BIDS-TP) students will be trained in collecting, managing, processing, interrogating, and analyzing large amounts of complex high-dimensional biomedical information with rigor and transparency AWD #1916425, Jagadish, Dinov, Athey, Role: (MPI) 06/03/19 – 5/31/25 Analyzing Big observational data including thousands of Parkinson's disease patients based on tens-of-thousands signature biomarkers derived from multi-source

imaging, genetics, clinical, physiologic, phenomics and demographic data elements. R01 CA233487, El Naqa (PI), Role: co-investigator 06/06/19 – 5/31/25 Develop modern radiation therapy (RT) to model, interrogate and analyze rich combinations of patient-specific information R01 MH121079, Monk, Hyde, Mitchell (PI) Role: co-investigator 08/15/19 – 6/30/25 This project develops data-driven analytics to design, apply and validate multilevel-multimodal models of Threat and Reward constructs in an existing longitudinal cohort at risk for psychopathology.

1. Guha S, Rodriguez-Acosta J, Dinov ID. A Bayesian Multiplex Graph Classifier of Functional Brain Connectivity Across Diverse Tasks of Cognitive Control. *Neuroinformatics*. 2024 Oct;22(4):457-472. PubMed Central PMCID: PMC11578796.
2. Cheng K, Shen Y, Dinov ID. Applications of Deep Neural Networks with Fractal Structure and Attention Blocks for 2D and 3D Brain Tumor Segmentation. *J Stat Theory Pract*. 2024 Sep;18(3) PubMed Central PMCID: PMC11671157.
3. Dinov ID. 2 ed. *Data Science and Predictive Analytics* [Internet] Cham, Switzerland: Springer; 2023. 900p. Available from: <https://link.springer.com/book/9783031174827> DOI: 10.1007/978-3-031-17483-4
4. Dinov ID., Velez MV. 1 ed. *Data Science* [Internet] Berlin: Walter De Gruyter; 2021. 450p. Available from: <https://doi.org/10.1515/9783110697827> DOI: 9783110697827

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2024 -	Henry P. Tappan Collegiate Professor, University of Michigan, Ann Arbor, MI
2022 -	Chair, Department of Systems, Populations, and Leadership, University of Michigan
2019 - 2021	Associate Director of the University of Michigan Neuroscience Graduate Program (NGP), University of Michigan, Ann Arbor, MI
2017 -	Professor, Health Behavior & Biological Sciences, and Computational Medicine & Bioinformatics, University of Michigan, Ann Arbor, MI
2015 - 2022	Associate Director, Michigan Institute for Data Science (MIDAS), University of Michigan, Ann Arbor, MI
2015 - 2017	Associate Professor, University of Michigan, Computational Medicine & Bioinformatics, University of Michigan, Ann Arbor, MI
2013 -	Director, Statistics Online Computational Resource (SOCR), University of Michigan, Ann Arbor, MI
2013 - 2017	Associate Professor, University of Michigan, Health Behavior and Biological Sciences, University of Michigan, Ann Arbor, MI
2008 - 2013	Associate Professor of Statistics, UCLA College of Arts & Sciences, Los Angeles, CA
2004 - 2013	Chief Operations Officer, Center for Computational Biology (CCB), UCLA School of Medicine, Los Angeles, CA
2002 -	Director, Statistics Online Computational Resource (SOCR), UCLA Statistics, Los Angeles, CA
2001 - 2008	Assistant Professor of Statistics, UCLA College of Arts & Sciences, Los Angeles, CA
2000 - 2002	Visiting Assistant Professor, Program in Computing, UCLA Mathematics, Los Angeles, CA
1998 - 2000	T32 Postdoctoral Fellow, Department of Neurology, UCLA School of Medicine, Los Angeles, CA

Honors

2010 - 2010	Runner up/Honorable mention in 2010 ASA Hands-On Statistics Activity Competition, American Statistical Association
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2008 - 2008	2008 IEEE Mathematical Methods in Biomedical Image Analysis (MMBIA) Best Paper Award, IEEE
2007 - 2007	"Gold" Award (July 2007), World Wide Web Awards™
2021	Inducted as an Honorary Member of Sigma Theta Tau International Society, Sigma Theta Tau International Society

C. Contribution to Science

1. 1. Spacekime Analytics: My group is pioneering a novel extension of 4D spacetime where longitudinal data can be represented in terms of complex 2D time (kime). The corresponding 5D spacekime manifold generalizes the classical time-series (curves) to kime-series, which are represented geometrically as surfaces. High-dimensional data can be modeled, interpreted, analyzed, and predicted using advanced spacekime analytical methods. This new approach unifies quantum mechanics, data science, and artificial intelligence methods.
 - a. Guha S, Rodriguez-Acosta J, Dinov ID. A Bayesian Multiplex Graph Classifier of Functional Brain Connectivity Across Diverse Tasks of Cognitive Control. *Neuroinformatics*. 2024 Oct;22(4):457-472. PubMed Central PMCID: PMC11578796.
 - b. Wang Y, Shen Y, Deng D, Dinov ID. Determinism, well-posedness, and applications of the ultrahyperbolic wave equation in spacekime. *Partial Differ Equ Appl Math*. 2022 Jun;5 PubMed Central PMCID: PMC9494226.
 - c. Zhang R, Zhang Y, Liu Y, Guo Y, Shen Y, Deng D, Qiu YJ, Dinov ID. Kimesurface Representation and Tensor Linear Modeling of Longitudinal Data. *Neural Comput Appl*. 2022 Apr;34(8):6377-6396. PubMed Central PMCID: PMC9355340.
 - d. Dinov ID., Velez MV. 1 ed. *Data Science [Internet]* Berlin: Walter De Gruyter; 2021. 450p. Available from: <https://doi.org/10.1515/9783110697827> DOI: 9783110697827
2. Predictive Big Data Analytics: My group is developing advanced computational protocols, machine learning tools, predictive analytics, and high-throughput modeling techniques, for managing, interrogating, analyzing, visualizing and interpreting large amounts of heterogeneous, multisource, incomplete, incongruent and multiscale data. For example, we recently validated a diagnostic decision support protocol for diagnostic prediction of Parkinson's disease using imaging, genetics, clinical, physiologic and cognitive data of over 600 patients (b). We examined the pros and cons of Big Healthcare Data by testing dozens of advanced techniques in variety of biomedical applications, and concluded the importance of team-driven scientific discovery in translational healthcare research (c). We recently presented the foundation of a new compressive big data analytics (CBDA) framework for representation, modeling and inference of large, complex and heterogeneous datasets (a). In the era of extremely large and complex datasets, sharing, aggregation, harmonization and joint modeling of complex datasets is critical. We developed a novel method for statistical obfuscation of sensitive information that provides a unique mechanism for sharing and merging of data that can be utilized for developing and translating advanced mathematical models, statistical techniques, and computational algorithms to tackle challenging biomedical and health problems (d).
 - a. Zhou Y, Zhao L, Zhou N, Zhao Y, Marino S, Wang T, Sun H, Toga AW, Dinov ID. Predictive Big Data Analytics using the UK Biobank Data. *Sci Rep*. 2019 Apr 12;9(1):6012. PubMed Central PMCID: PMC6461626.
 - b. Marino S, Zhou N, Zhao Y, Wang L, Wu Q, Dinov ID. HDDA: DataSifter: statistical obfuscation of electronic health records and other sensitive datasets. *J Stat Comput Simul*. 2018;89(2):249-271. PubMed Central PMCID: PMC6450541.
 - c. Gao C, Sun H, Wang T, Tang M, Bohnen NI, Müller MLTM, Herman T, Giladi N, Kalinin A, Spino C, Dauer W, Hausdorff JM, Dinov ID. Model-based and Model-free Machine Learning Techniques for Diagnostic Prediction and Classification of Clinical Outcomes in Parkinson's Disease. *Sci Rep*. 2018 May 8;8(1):7129. PubMed Central PMCID: PMC5940671.
 - d. Dinov ID, Heavner B, Tang M, Glusman G, Chard K, Darcy M, Madduri R, Pa J, Spino C,

Kesselman C, Foster I, Deutsch EW, Price ND, Van Horn JD, Ames J, Clark K, Hood L, Hampstead BM, Dauer W, Toga AW. Predictive Big Data Analytics: A Study of Parkinson's Disease Using Large, Complex, Heterogeneous, Incongruent, Multi-Source and Incomplete Observations. *PLoS One*. 2016;11(8):e0157077. PubMed Central PMCID: PMC4975403.

3. High-throughput distributed computing: My colleagues and I have designed, developed and validated an efficient, distributed computational environment that enables the construction, execution, testing, replication and broad dissemination of advanced pipeline workflows. This pipeline environment has been used to study a broad range of biomedical problems from high-throughput neuroimaging analyses and brain mapping studies (a,d) to next generation genomics computing (b,c), neurodegenerative analyses using Big Data (d).
 - a. Marino S, Zhou N, Zhao Y, Wang L, Wu Q, Dinov ID. HDDA: DataSifter: statistical obfuscation of electronic health records and other sensitive datasets. *J Stat Comput Simul*. 2018;89(2):249-271. PubMed Central PMCID: PMC6450541.
 - b. Dinov ID, Petrosyan P, Liu Z, Eggert P, Zamanyan A, Torri F, Macchiardi F, Hobel S, Moon SW, Sung YH, Jiang Z, Labus J, Kurth F, Ashe-McNalley C, Mayer E, Vespa PM, Van Horn JD, Toga AW. The perfect neuroimaging-genetics-computation storm: collision of petabytes of data, millions of hardware devices and thousands of software tools. *Brain Imaging Behav*. 2014 Jun;8(2):311-22. PubMed Central PMCID: PMC3933453.
 - c. Dinov ID, Torri F, Macchiardi F, Petrosyan P, Liu Z, Zamanyan A, Eggert P, Pierce J, Genco A, Knowles JA, Clark AP, Van Horn JD, Ames J, Kesselman C, Toga AW. Applications of the pipeline environment for visual informatics and genomics computations. *BMC Bioinformatics*. 2011 Jul 26;12:304. PubMed Central PMCID: PMC3199760.
 - d. Dinov I, Lozev K, Petrosyan P, Liu Z, Eggert P, Pierce J, Zamanyan A, Chakrapani S, Van Horn J, Parker DS, Magsipoc R, Leung K, Gutman B, Woods R, Toga A. Neuroimaging study designs, computational analyses and data provenance using the LONI pipeline. *PLoS One*. 2010 Sep 28;5(9) PubMed Central PMCID: PMC2946935.
4. Open-Science Resources: I have developed a comprehensive network of open-science resources including software tools, web-services, data repositories, learning activities and instructional materials. All of these resources blend research (b), education (a,d), modern IT and web-technologies (c), promote active collaboration, big data analytics (d), and community extensions (CC-BY and LGPL licensing), support resource-interoperability via human and machine interfaces, and encourage broad validation, sustainability, and multidisciplinary interactions. There have been a total of over 15 Million daily-unique users of these open-science resources. See SOCR.umich.edu, SOCR.ucla.edu, wiki.socr.umich.edu, wiki.stat.ucla.edu/socr, and github.com/SOCR.
 - a. Dinov ID. Modernizing the Methods and Analytics Curricula for Health Science Doctoral Programs. *Front Public Health*. 2020;8:22. PubMed Central PMCID: PMC7031195.
 - b. Dinov ID. Quant Data Science meets Dexterous Artistry. *Int J Data Sci Anal*. 2019 Mar;7(2):81-86. PubMed Central PMCID: PMC6433171.
 - c. Dinov ID, Siegrist K, Pearl DK, Kalinin A, Christou N. Probability Distributome: A Web Computational Infrastructure for Exploring the Properties, Interrelations, and Applications of Probability Distributions. *Comput Stat*. 2016 Jun;31(2):559-577. PubMed Central PMCID: PMC4856044.
 - d. Dinov ID, Christou N. Web-based tools for modelling and analysis of multivariate data: California ozone pollution activity. *Int J Math Educ Sci Technol*. 2011 Sep 1;42(6):789-829. PubMed Central PMCID: PMC3901438.