BIOGRAPHICAL SKETCH

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NAME: Todd Gary

eRA COMMONS USER NAME (credential, e.g., agency login): TPGARY

POSITION TITLE: Director, Research and Community Development, School of Applied Computational Sciences

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)*	Completion Date MM/YYYY	FIELD OF STUDY
Point Loma Nazarene University, San Diego CA	BA	06/1984	Biology/Chemistry
Vanderbilt University, Nashville TN	PhD	08/1992	Molecular Biology
Vanderbilt University Medical Center, Nashville TN	Postdoctoral	06/1994	Medicine (NIH Fellowship)
University of California, Los Angeles (UCLA) Los Angeles, CA	Faculty Sabbatical	08/2002	Bioinformatics

A. Personal Statement

As the director of community and research development for School of Applied Computational Sciences (SACS), I am focused on building SACS's external partners, including members of the regional and national biomedical data science industry. I have experience working in the **healthcare data science industry** as a visiting scholar and as Director of Research at WPC Healthcare (which received national recognition for creating the *Sepsis Condition Awareness Platform*). I also have experience advising graduate students throughout their data science practicum projects, many of which were conducted with industry partners including several Fortune 500 companies and nationally known healthcare scientists.

I have extensive experience with high-caliber research at **Historically Black Colleges and Universities** (HBCUs), including working with the HBCU scientist, Greg Henry, who discovered the first planet outside of our solar system. My background includes scientific contributions to the fields of virology, medicine, astrobiology, science education, and data science.

I have over 20 years of experience creating major research and infrastructure projects within the community of Minority Serving Institutions, especially HBCUs:

- **At the University Level**: I founded and directed the Institute for Understanding Biology Systems for 10 years, helping to create and fund undergraduate research programs at Tennessee State University, an HBCU;
- **At the National Level**: I co-founded and directed the Minority Institute Astrobiology Collaborative (MIAC), and the NASA Minority Institution Research Support (MIRS) program, both of which are now celebrating their 20th year of operation. These programs attracted the attention and support of Nobel laureate Barry Blumberg (*Pilcher, 2015*) and were presented at the National Academies of Science. This work led to research support and faculty development, which allowed 30 faculty members to receive external funding and faculty promotions.
- I have **collaborated** with faculty members from more than 20 MSIs on research proposals and have had great success **mentoring students in research**. I developed an undergraduate research model published in the Council of Undergraduate Research (*Gary, et al, 2010*), and have had more than 40 students as co-authors on publications and presentations at national conferences. I also have experience as a **supervisor,** including hiring and training more than 20 part-time and full-time staff members and 40 volunteers to engage as many as 8,000 K-12 students in STEM activities at an HBCU.

B. Positions and Honors

Positions and Employment

1992 – 1994 NIH Postdoctoral Research Fellow, Department of Medicine, Vanderbilt University Medical Center
1994 – 1997 Lecturer, Departments of Molecular Biology and Chemistry, Vanderbilt University, Nashville, TN
1997 – 2011 Positions at Tennessee State University, Nashville, TN
Scientist in Residence, NSF Systemic Reform Program at TSU (1997-2000)
Associate Professor of Biological Sciences (2002 – 2010)
Director, Institute for Understanding Biological Systems (2002 - 2011)
Director, Undergraduate and Creative Activities (UReCA) Program (2009-2011)
2002 – 2016 Co-Director, Minority Institution Astrobiology Collaborative (National Organization)
2016 – 2020 Adjunct Faculty in Data Science, College of Computing Technology, Lipscomb University
2013 – 2017 Special Assistant to the Vice Provost for Research, Middle Tennessee State University, Murfreesboro, TN
2016 – 2017 Visiting Scholar in Data Science and Director of Research, WPC Heathcare, Franklin, TN
2017 – 2020 Associate Vice President for Research & Community Development, Trevecca Nazarene University, Nashville, TN
2020- Director, Research and Community Development, School of Applied Computational Sciences, Meharry Medical College, Nashville, TN

Honors

1992 – 1994 NIH National Research Service Award
1995 Nominated into Sigma Xi Scientific Honor Society
1997 Introduction to Human Gene Therapy Course Selected as Best Use of Technology in Teacher Training by the *National Council for the Accreditation of Teacher Education*
1997 Manuscript Nominated for Paper of the Year, National Association of Research in Science Teaching
2002 Recognition by Congressional Black Caucus for STEM pipeline diversity program
2006 Former student, LaTasha Taylor, appears in diversity article in the journal Science (*Science: 312:1454*)
2007 Invited to present MSI contributions to National Academies of Science NASA review committee
2008 Selected to Serve on an Ad Hoc Committee for the National Academies of Science
2008 Outstanding Faculty Mentor, TSU Association of Pre-professional Life Scientists
2008 NASA Student Pipeline Award (Given by the National SEMAA Office)
2008 NASA Group Achievement Award: (*given by NASA Administrator, Michael Griffin*)
2010 – 2011 Selected to Participate in TSU's Presidential Fellowship Program
2012 Selected into the Teaching Fellows Program (a Partnership between O'More College & Oxford Univ.)
2016 – 2020 Mentor: Eight 1st Place Recipients in Graduate Research, Lipscomb Scholar Symposium
2017 Awarded Best Use of AI in Healthcare by Global AI (Team Award)
2017 Nominated for *Healthcare Hero of the Year in Research* by the Nashville Business Journal

C. Contributions to Science

Viral Evolution: My PhD dissertation resulted in one of the first publications to describe how new strains of viruses evolve at the DNA level.

Gary, T, Colowick, N., & Mosig, G. (1998). A species barrier between bacteriophage T4 and T2: recombination, mutagenesis and exclusion in the dCTPase genes and implications for the evolution of species at the molecular level. *Genetics* 148: 1461-1473

Fellowship in Medicine: Molecular Understanding of Patients Lacking Neurotransmitters

My NIH funded research fellowship was under the direction of David Robertson, M.D., who is internationally known for his groundbreaking work in defining and treating often-debilitating neurological disorders of blood pressure regulation. My work helped provide an understanding of patients that lack of gene expression of dopamine-beta-hydroxylase in the first human patients lacking major neurotransmitters (noradrenaline and adrenaline) and helped in our understanding of the human autonomic nervous system.

Gary, T, & Robertson, D. (1993). Lessons learned from DbH deficiency. *News in Physiological Sciences*, 9:35-39.

National Model for Pre-Service Teachers Using Technology

As part of a nationally recognized team, I worked with Angelo Collins, former chair of the National Science Standards. We created a course on human gene therapy for elementary education majors at Vanderbilt University which integrated science content, science methods, and technology, and was a case illustration of the best use of technology in a teacher preparation program by NCATE (National Council for the Accreditation of Teacher Education) in their publication *Technology and the New Professional Teacher: Preparing for the 21st Century Classroom.*

Strengthening Research Infrastructures Minority Serving Institutions

My work with 30 MSIs is described in my personnel statement and was presented in a committee at the National Academies of Science and resulted in the co-organization of a NASA workshop on improving relationships with MSIs (which was published as a technical report with recommendation that have been incorporated into NASA Ames Research Center's Office of Strategic Partnerships).

Langhoff, S., Bradford, K., and **Gary, T.** (2010) Improving Minority Institution Collaborations with NASA: NASA Conference Proceeding NASA Technical Report pg. 1- 53. (NASA/CP-2010-216379).

Directed the MIRS program, which resulted in 20 MSI faculty members receiving research grants and establishing labs. The program has had a high return on federal investment and was featured in tribute to Nobel laureate Barry Blumberg (*Pilcher, 2015*). The MIRS program has been present at 20 national conference since 2002.

Brown, C., Bradford, Bell, B., **Gary, T**., Myles, E., Kuner, S., Kirven-Brooks, M., & Ceballos, C. (2012). The NASA Astrobiology Institute - Minority Institution Research Support (NAI-MIRS) Program: 10 Years of High Return on NASA's Investment. Proceeding of the 2012 Astrobiology Science Conference. p. 78.

Designed a model for experiential learning and research based upon the success of students at Tennessee State University, an HBCU

Gary, T., Anrino de la Rubia, L., Brinkley, M., & Thompson, M. (2010). The Scholar's Experience at TSU. *Council on Undergraduate Research (CUR) Focus* 31(1): 6-10. **Significance:** A research tested model created at TSU for increasing retention and graduation of undergraduates involving research, service learning, leadership, travel abroad, career development, and internships.

Sepsis Condition Awareness Platform

As a visiting scholar and later as Director of Research at WPC Healthcare, I guided and provided research support for the development, launch, and implementation of healthcare data science products, such as WPC's *Sepsis Condition Awareness Platform* **(**which accurately predicts patients in an emergency room at risk of sepsis). The *Sepsis Platform* Received the 2017 Global Annual Achievement award for "**Best Use of Artificial Intelligence in Food, Health and Medicine"** and a nomination for the Nashville Business Journal's *Healthcare Hero in Research*.

Gary, T., Mingle, D., Yenamandra A (2016). The Evolving Definition of Sepsis. *International Clinical Pathology Journal* 2(6):63-69.

Data Science Research Projects at the Graduate Level

I taught and mentored 82 graduate students completing master's degrees in data science or software engineers receiving a concentration in data science. The courses I taught (research methods in data science and data science practicum 1) established the foundation for real-world publishable research projects. This foundation included connecting student to subject matter experts, technical experts, and regional and national companies. Below are a few examples of the publications and presentations at national conferences, with the names of students presented in bold:

Diaz, G., Jones, J., Brandt, T., Gary, T., & **Yenamandra, A**. (2017). Translating data into discovery: Analysis of 10 years of CDC data of mortality indicates level of attainment of education as a suicide risk factor in USA. *Soc. Behav. Res. Pract*, *2*, 1-17.

Holt, R., Aubrey, S., DeVille, A., Haight, W., Gary, T., & Wang, Q. (2019). Deep Autoencoder Neural Networks for Detecting Lateral Movement in Computer Networks. In *Proceedings on the International Conference on Artificial Intelligence (ICAI)* (pp. 277-283).

Glock, K., Napier, C., Louie, A., Gary, T., Gigante, J., Schaffner, W. & Wang, Q. (2020). Measles Rash Image Detection Using Deep Convolutional Neural Network. *arXiv preprint arXiv:2005.09112*. and submitted to the IEEE Journal of Biomedical and Health Informatics.

D. Additional Information: Research Support and/or Scholastic Performance

STEM K-12 Diversity Pipeline Connections to HBCUs

- I was the scientist-in-residence at an HBCU for three years, working with 3,000 public school teachers in Middle Tennessee on the largest NSF Systemic Change in Science Education award to an HBCU. This resulted in sustained system-wide focus on STEM curriculum, $5 million in K-6 science equipment, and sustained professional development for teachers.
- I directed a K-12 NASA- and NSF-funded outreach program at Tennessee State university, which engaged 8,000 K-12 students and their parents in STEM activities at an HBCU. This resulted in a NASA STEM diversity pipeline award and was a part of a national NASA STEM diversity program which was recognized by NASA Administrator, Michael Griffin.

Support for HBCU STEM Graduate Education

I served as the TSU coordinator and mentor on a 10-year NSF GK-12 program that brought more than 50 graduate students of color from TSU, Meharry Medical College, Vanderbilt University, and Fisk University into middle school classrooms as role models, introducing thousands of minority middle students to STEM career opportunities.

Research Support

Past research and educational support:

2001 – 2015	PI or Co-PI on 11 NASA Awards between 2001-2015 including the Minority Institution Research Support Program totaling $2 million.
2005 – 2011	PI on two NSF awards totaling $450,000
1997 – 2011	Supporting roles on NSF and NASA research center grants to TSU, an HBCU totaling $10 million.
2003 – 2013	Supporting roles on 4 NSF awards supporting graduate education at HBCUs totaling $5.8 million. Two of these NSF awards were with Meharry Medical College (NSF #0231969 and NSF #9979578)