Constantin (Ted) D. Malliaris

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Education

M.S. (all but dissertation for Ph.D.), Physics, Rutgers University 2023
M.S., Physics, New York University 2011
A.B. *magna cum laude*, Chemistry & Physics, Harvard University 2004

Skills, Libraries, & Programming Languages

C/C++: STL, Boost, GSL, Make/gcc/g++/GDB, GMP, MPFR, CUDA, NAMD, OpenFOAM
Python: NumPy, SciPy, matplotlib, SymPy, NetworkX, Jupyter, `pip`/`venv`, Django, TensorFlow
OS, cluster, cloud: Linux, MPI, Slurm, Linode, Google Cloud Platform, GNU Emacs/Screen
Documents, graphics: LaTeX, beamer, Ti*k*Z, graphviz, Inkscape, GIMP, Blender, HTML/CSS, Tkinter
Other: Mathematica, Java/Android, PHP, JavaScript, MySQL, LabVIEW, git,

Research & Software Engineering

➢ SSNS: Simple Stochastic and Nonlinear Simulator, a web app 2023 – 2024
Object-oriented JavaScript code (with HTML/CSS interface) offering interactive exploration of ∼10 examples from various STEM fields: stochastic processes, statistical mechanics, nonlinear dynamics, fluid dynamics. Live at `tedm.us/SSNS`. Code on .

➢ Analytical/approximation thesis research 2022 – 2023
Application of finite-difference-based numerical methods to approximate the one-step processes stationary distribution; for processes with polynomial stepping probabilities, development of generalized form based on the number/nature of roots; comparison with the exact iterative solution and established approximation techniques.

➢ Code for numerical evaluation of thesis results 2022 – 2023
Implementation of multiple one-step processes, each derived from abstract `OneStepModel`; arbitrary precision libraries for careful handling of very small values.

➢ Monte Carlo sequence network population genetics simulation code 2014 – 2020
Parallel C++ code to perform "measurements" to augment/inform theory; single MPI master process for file I/O and worker communication; Python scripts for compiling, cluster interaction, data analysis; used in project below, Khromov et al., etc.

➢ First passage population dynamics on regular sequence networks 2016 – 2019
Description of evolutionary search as a first passage process; expressions depend on the allele frequency spectrum and other "de-labeled" steady state quantities; good agreement with simulations across parameter space, including the polymorphic regime.

➢ Code to compute theory values (for sampling probabilities, etc.) in Khromov et al. 2015 – 2018
C++ code to numerically evaluate difficult expressions (e.g., nested infinite sums) in arbitrary fitness generalization of Ewens' formula; handling of parameter-dependent rate of convergence, overflow/underflow, etc.

➢ Web portal setup/deployment at NYU High Performance Computing Group 2010 – 2011
Portal displayed cluster metrics and resource utilization; main project as member of New York University HPC technical staff.

➢ 3D Euler fluid dynamics code 2008
C++ final project for Computational Physics course; Runge-Kutta methods, stability analysis, 1D shock tube tests, visualization.

➢ System administration, personal domain `tedm.us` 2003 – *present*
SSH, passwordless login, data backup scripts, internal/external Django web apps, MySQL backend.

Teaching

- University of Massachusetts, Boston — Client for CS 410, Spring 2024
  Acted as one of several clients in undergraduate software engineering class; designed project "Pseudorandom Number Generator Heatmap Art"; met weekly with group of eight students to guide their implementation; see github.com/UMB-Heatmap.

- Rutgers University — Adjunct Instructor / TA, Dept. of Physics & Astro.
  General Physics I/II, recitation (Fall 2019, 2018, 2017, 2016; Spring 2019, 2018, 2017; Summer 2018, 2017, 2015, 2014); Honors Physics II and Analytical Physics IIB, recitations (Spring 2014); General Physics II, laboratory (Summer 2013).

- New York University — Adjunct Instructor / TA, Department of Physics
  Physics I/II, recitation/laboratory (Spring 2011, Spring 2010, Fall 2009); Eng. Physics III, recitation and laboratory (Spring 2011); Natural Science I, recitation (Spring 2009); 20th Century Concepts In Space, Time & Matter, recitation (Fall 2008).

- George Washington University / American University — Adjunct Instructor, Departments of Chemistry
  University Physics I (GW, Spring 2008); Organic Chemistry II, laboratory (GW, Spring 2008); Organic Chemistry I, laboratory (GW, AU Fall 2007); The Molecular World (AU, Spring 2008, Fall 2007).

- St. Stephen's School / St. Albans School (DC area) — Science Teacher, Coach
  Taught physics and chemistry. Assistant Coach on rowing, JV basketball, and JV football teams (2005 – 2008).

- Harvard University — Teaching Fellow, Department of Chemistry
  Inorganic Chemistry (Fall 2004). New course for incoming freshmen. Point groups, coordination chemistry, organometallics.

Publications & Original Work

- Constantin D. Malliaris — 2023
  "Application of Finite Difference Approximations to One-step Stochastic Processes"
  unpublished thesis work under Alexandre V. Morozov

- Pavel Khromov, Constantin D. Malliaris, Alexandre V. Morozov — 2018
  "Generalization of the Ewens sampling formula to arbitrary fitness landscapes"
  PLOS ONE, **13**, 1–23, doi.org/10.1371/journal.pone.0190186

- Constantin D. Malliaris — 2010
  "Molecular Dynamics Simulation and Experimental Unfolding of Fluorinated Ubiquitin"
  Master's thesis under Jasna Brujić, Alexander Grosberg, & Eric Vanden-Eijnden

- Hoebel, S., Balss, K., Jones, B., Malliaris, C. D., Munson, M., Vreeland, W., Ross, D. — 2006
  "Scanning Temperature Gradient Focusing"
  Analytical Chemistry, **78**, 7186–7190, doi.org/10.1021/ac060934r

- Ross, D., Malliaris, C. D. — 2004
  "Whole Column Resistance Detection for Focusing Methods of Separation"
  IP.com Prior Art Database disclosure, priorart.ip.com/IPCOM/000028351

Honors & Awards

Rutgers Excellence Fellowship, Rutgers University	2011 – 2012
Henry M. MacCracken Program Graduate Fellowship, New York University	2008 – 2010
Summer Undergraduate Research Fellowship, NIST	Summer 2003
National Merit Scholarship, National Merit Scholarship Corporation	1999

References

available upon request