Timothy Andrew Manning

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Education

- Ph.D in Physics, 2014, University of Maryland, College Park, MD
- M.S. in Physics, 2007, University of Alabama in Huntsville, Huntsville, AL
- B.S. in Physics, Minors in Math and Computer Science, 2005, University of Alabama in Huntsville, Huntsville, AL, Summa Cum Laude, GPA 4.0

Employment History

- **Senior Research Programmer**
  National Center for Supercomputing Applications, Urbana, IL
  October 2019 – present
  Supported scientific research by developing software utilizing high performance computing systems. Advanced the state of the art in astronomical observation systems by designing, building, and deploying web-based infrastructure enabling next-generation research and discovery.

- **Senior Principal Physicist**
  Northrop Gumman Corporation, Linthicum Heights, MD
  March 2014 – October 2019
  Superconducting electronics design and development, primarily advancing reciprocal quantum logic (RQL) technology.

- **Graduate Researcher**
  University of Maryland, College Park, MD
  August 2007 – present
  Performed experiments studying enhanced ion fluorescence collection using cavity quantum electrodynamics, and developed quantum gate techniques for scalable trapped ion quantum computing.

- **Graduate Researcher**
  University of Alabama in Huntsville, Huntsville, AL
  August 2005 – May 2007
  Performed materials research for a space telescope project, involving blowing glass optics in vacuum and taking strength measurements of glass under vacuum after thermal treatment.

- **Web Designer/Thermal Modeler**
  Signature Research, Inc., Huntsville, AL
  July 2004 – August 2005, May – August 2007

Thermal modeling of military vehicles, programming heat transfer simulation and thermal signature prediction software, designing and creating military database website.

- **Research Tech Assistant**
  UAH Aerophysics Center, Huntsville, AL
  March 2004 – July 2004
  Assisted instrumentation personnel, performed X-ray computer archival, helped to develop optical sensors.

- **Research Assistant**
  Center for Irradiation of Materials, Alabama A&M University, Normal, AL
  January 2003 – August 2003
  Performed analysis of Rutherford backscattering spectroscopy spectra, helped maintain and operate particle accelerator, presented poster session of research at the 2003 International Conference on Ion Beam Analysis in Albuquerque, NM

Skills and Work Experience

- Experienced DevOps engineer using and related tools including Kubernetes, Docker, Helm, ArgoCD, Git, Rancher, OpenStack, Vault, Terraform
- Experience creating and maintaining computer networks and backup systems, working with virtual machines and containerization
- Working knowledge of Python, PHP, HTML, JavaScript, CSS, shell scripting, Visual Basic, LabView, C/C++; experience with Java, MySQL, BASIC, FORTRAN, Igor
- Proficient with many operating systems including Linux, Mac OS, Windows, DOS; familiar with a wide variety of software applications including Mathematica, MATLAB, LabView, Autodesk Inventor CAD, Charged Particle Optics, Eagle, Microsoft Office, LibreOffice
- Experience designing and building custom electronics, including circuits at radio and microwave frequencies
- Designed and constructed several ultra-high vacuum systems which integrated complex ion trap structures and associated electronics
- Designed and constructed sophisticated optical systems, involving diode lasers, mode-locked pulsed lasers, optical frequency stabilization, and electro-optic and acousto-optic modulators

Publications and Presentations

- *The Dark Energy Survey Data Release 2*, T. M. C. Abbott et al, ApJS 255 20 (2021) (arXiv:2101.05765).
- Quantum information processing with trapped ion chains (http://iontrap.umd.edu/wp-content/uploads/2014/03/ManningThesis.pdf), T. Andrew Manning, Ph.D. Physics (2014).
- *Optimal Quantum Control of Multimode Couplings between Trapped Ion Qubits for Scalable Entanglement (http://iontrap.umd.edu/wp-content/uploads/2012/12/PhysRevLett.112.190502.pdf)*, T. Choi, S. Debnath, **T. A. Manning**, C. Figgatt, Z.-X. Gong, L.-M. Duan, and C. Monroe, Phys. Rev. Lett. 112, 19502 (2014).
- *Beat Note Stabilization of Mode-Locked Lasers for Quantum Information Processing (http://iontrap.umd.edu/wp-content/uploads/2012/12/ol-39-11-3238.pdf)*, R. Islam, W. C. Campbell, T. Choi, S. M. Clark, S. Debnath, E. E. Edwards, B. Fields, D. Hayes, D. Hucul, I. V. Inlek, K. G. Johnson, S. Korenblit, A. Lee, K. W. Lee, **T. A. Manning**, D. N.

Matsukevich, J. Mizrahi, Q. Quraishi, C. Senko, J. Smith, and C. Monroe, Optics Letters, Vol. 39, Issue 11, pp. 3238-3241 (2014).

- *Quantum Networks with Atoms and Photons (http://iontrap.umd.edu/wp-content/uploads/2012/12/Monroe_JPA.pdf)*, C Monroe, W Campbell, C Cao, T Choi, S Clark, S Debnath, C Figgatt, D Hayes, D Hucul, V Inlek, R Islam, S Korenblit, K Johnson, **A Manning**, J Mizrahi, B Neyenhuis, A Lee, P Richerme, C Senko, J Smith and K Wright, ICOLS 2013: J. Phys. Conf. Ser. 467, 012008 (2013).
- *Photon collection from a trapped ion-cavity system (http://iontrap.umd.edu/wp-content/uploads/2012/12/e062308.pdf)*, J. D. Sterk, L. Luo, **T. A. Manning**, P. Maunz, and C. Monroe, Phys. Rev. A 85, 062308 (2012).
- *Photon Collection from a Trapped Ion in a Cavity*, Contributed Talk, Division of Atomic, Molecular and Optical Physics Annual Meeting, Atlanta, GA (2011).
- *Light Collection from a Trapped Ion in a Cavity*, Poster presentation, Southwest Quantum Information and Technology Annual Meeting, Boulder, CO (2011).
- *Random Numbers Certified by Bell's Theorem (http://iontrap.umd.edu/wp-content/uploads/2012/12/Random-numbers-certified-by-Bell%E2%80%99s-theorem.pdf)*, S. Pironio, A. Acin, S. Massar, A. Boyer de la Giroday, D. N. Matsukevich, P. Maunz, S. Olmschenk, D. Hayes, L. Luo, **T. A. Manning**, C. Monroe, Nature 464, 1021 (2010).
- *Protocols and Techniques for a Scalable Atom–Photon Quantum Network (http://iontrap.umd.edu/wp-content/uploads/2012/12/Luo-2009-Scalable-atom-photon-network.pdf)*, L. Luo, D. Hayes, **T.A. Manning**, D.N. Matsukevich, P. Maunz, S. Olmschenk, J.D. Sterk, and C. Monroe, Fortschritte der Physik 57, 1133-1152 (2009).
- *In vacuo glass blowing and strength measurements* : a thesis, **Manning, T.A.**, Master's thesis, University of Alabama Huntsville (2007).
- *Vacuum Strength of Two Candidate Glasses for a Space Observatory*, **Manning, T. A.**, Tucker, D. S., Herren, K. A. and Gregory, D. A. (2007). Journal of the American Ceramic Society, 90: 3318–3319.
- *Novel in-space manufacturing concepts for the development of large space telescopes*, J.T. Mooney, P. Reardon, D. Gregory, **A. Manning**, J. Blackmon, T. Howsman, P. Williams, W. Brantley, J. M. Rakoczy, K. Herren, D. Tucker, A. Sharma, Astronomical Telescopes and Instrumentation Conference, May 24-31, 2006, Orlando, FL.
- *Thermal Signature Modeling and Assessment of Camouflage, Concealment, and Deception Schemes for Multiple Threat Ground Systems*, Rinald, D., Sanders, J., **Manning, T.**, Proceedings of the Military Sensing Symposium, CC&D Parallel Meeting, February 13-17, 2006, Orlando, FL.
- *RUMP simulation of RBS spectra taken on nanometerscale multi-layer coatings - A student's work*. **Manning, A.**, A. M. Elsamadicy, L. W. Hillman and R. L. Zimmerman, C. I. Muntele and D. Ila. Ion Beam Analysis Conference, New Mexico (2003).

Academic Honors

- Graduate Dean's List
- College of Science Honor: Physics Dept. “Top Student” 2005
- National Merit Scholar
- Boeing Presidential Scholar
- UAH Honor Scholar (Fall 2001 – Summer 2005)