

**Yisa S. Rumala**

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**Education:**

University of Michigan, Ann Arbor, MI, USA  
 PhD student, Applied Physics (2006-present)

University of Michigan, Ann Arbor, MI, USA  
 M.S.E. in Electrical Engineering, 2008

York College of The City University of New York (CUNY), Queens, NY, USA  
 B.S. in Physics, Mathematics, 2006  
 Graduated *Summa Cum Laude* (Highest honors)

**Academic Awards and Honors:**

- Rackham travel grant to the American Physical Society DAMOP meeting, U of M (2010)
- NSF sponsored Alliance for Graduate Education Professorate (AGEP) mini-grant, U of M (2009)
- Applied Physics Fellowship to The International Conference on Atomic Physics (ICAP) Summer School at MIT, University of Michigan (2008)
- National Science Foundation Graduate Research Fellowship (2006, Active period: 2008- 2011)
- Rackham Merit Fellowship, and Applied Physics Fellowship, University of Michigan (2006-2009)
- Rackham Summer Institute Fellowship, University of Michigan (2006)
- Certificate of Academic Excellence in Physics, York College (2006)
- Certificate of Academic Excellence in the Honors program, York College (2006)
- Sigma Xi Scholars Award for Excellence in Research, York College (2006)
- Ronald E. McNair Scholar, York College (2005-2006)
- Carver Bancorp Scholarship, CUNY (2005-2006)
- University Student Senate Merit Scholarship, CUNY (2005)
- Arthur BC Walker Scholarship, National Society of Black Physicists (2005)
- Barnes & Noble Scholarship for Academic Excellence, York College (2005)
- Second Place poster presentation of research results in the Physical & Mathematical Sciences category at the Gathering of Science Scholars II National Conference and Research Symposium, Stony Brook University, New York (2005)
- The Chancellor's list (2005, 2006)
- Pepsi-Cola Scholarship for Academic Excellence, York College (2005)
- First Place poster presentation of research results in the Mathematics category at the 12<sup>th</sup> Annual Florida – Georgia LSAMP Expo Conference, University of Central Florida, Orlando (2005)
- Collegiate All American Scholar, United States Achievement Academy (2003, 2005)
- NSF sponsored New York City Louis Stokes Alliance for Minority Participation (LSAMP) Research Assistance Scholarship, CUNY (2004 - 2006)
- NSF sponsored Computer and Mathematics Support Scholar Coalition, York College (2004-2006)
- The National Dean's list (2003 -2006)
- Certificate of Academic Excellence for being on York College Dean's list (2003 -2006)
- Best Student in Applied Electricity prize, Federal Government College, Minna (High school) (2002)

### Selected press:

- "More superstars choose CUNY" , Appeared in New York Times, Daily News, New York Post ...etc (2006)
- "Meeting of Minds at CUNY", Appeared on busses, bus shelters, Subway carts, and various public places in New York City (2006, 2007)

### Honorary societies, Affiliations, and Extra Curricula Activities:

- American Physical Society (2010)
- Elected to the York College Honor Society for the Liberal Arts (2006)
- Inducted into Sigma Xi (Scientific Research Society) (2006)
- National Society of Black Physicists (NSBP) (2005)
- Vice president for York College Mathematics club (fall 2005, spring 2006)
- York College Honors Program (2004 - 2006)
- Designated a member of the SREIP of The Leadership Alliance (2004)
- Play Soccer, football

### Service and outreach:

- Science Judge for the Michigan Physics Olympiad (2008- present)
- Participate in various science shows under the auspices of Women in Science and Engineering (WISE), Society for Women in Physics (SWIP) (2008 - present) and NSBP (2006) to get students excited about science at local high schools
- Moderator for the undergraduate poster and oral presentations at the Leadership Alliance National Symposium, Chantilly, VA, USA (07/2009)
- Recruiting students to the U of M Applied Physics and Engineering graduate program at the National Society of Black Engineers (NSBE) Conference, Las Vegas, NV (03/2009)

### Publications:

1. "High resolution q-space imaging studies of water in elastin" G. Boutis, C. Renner, T. Isahkarov, T. Islam, L. Kannangara, P. Kauer, E. Mananga, A. Ntekim, Y. Rumala, D. Wei. *Biopolymers*, 87, pg 352-359 (2007)
2. "On the application of magic echo cycles for quadrupolar echo spectroscopy of spin-1 nuclei" E.S. Mananga, R. Roopchand, Y.S. Rumala, G.S. Boutis. *Journal of Magnetic Resonance*, 185, pg 28-37 (2007)
3. "The quantum cascade laser: Will it be the mid and far infrared laser of the future?" Y. Rumala. *The York Scholar*, 3, pg 52-63 (2006) – Annually publishes outstanding undergraduate papers
4. "Finite pulse width artifact suppression in spin-1 quadrupolar echo spectra by phase cycling" E.S. Mananga, Y.S. Rumala, G.S. Boutis, *Journal of Magnetic Resonance*, 181, pg 296-303 (2006)
5. "Direct liquid cooling of room-temperature operated quantum cascade lasers," J. Z. Chen, Z. Liu, Y.S. Rumala, D.L. Sivco, C.F. Gmachl. *Electronics Letters*, 42, No. 9, pg 534-535 (2006)

### Conference proceedings and other publications:

6. "An analysis of the magic echo and solid echo sequence for quadrupolar spectroscopy of spin  $I=1$  nuclei by average Hamiltonian theory", E.S. Mananga, R. Roopchand, Y.S. Rumala, G.S. Boutis., *American Institute of Physics Conference Proceedings*, 991, pg 71-74, (2008)
7. "High resolution q-space imaging studies of water in elastin" G. Boutis, C. Renner, T. Isahkarov, T. Islam, L. Kannangara, P. Kauer, E. Mananga, A. Ntekim, Y. Rumala, D. Wei. *American Institute of Physics Conference Proceedings*, 1081, pg 59-62, (2008)

8. Provided a solution to Problem 767 (Y. Rumala, F. Mawyer,), Remainder in Taylor's Formula, proposed by Ovidiu Furdai, *The College Mathematics Journal*, 36, pg75 – 76 (2005)
9. Provided a solution to Problem 768 (Y. Rumala, F. Mawyer), Hyperbolic and exponential functions, proposed by Michel Bataille, *The College Mathematics Journal*, 36, pg 76 – 77 (2005)

### Presentations (Talks at seminars, conferences, panels etc)

1. "Counter-rotating optical vortex photons for atom optics", *University of Michigan Applied Physics Seminar*, Ann Arbor MI, USA (10/2010)
2. "Optical vortex photons for angular diffraction of ultra-cold atoms", *University of Michigan Physics Graduate Student Symposium*, Ann Arbor MI, USA (08/2010)
3. "Optical vortices for angular diffraction of atoms", *American Physical Society DAMOP conference*, Houston TX, USA (05/2010)
4. "Designing the spatial structure of optical vortices", *Impact of Research on a Diverse Society Symposium*, Ann Arbor, MI, USA (04/2010)
5. "Designing the spatial structure of optical vortex photons" *Michigan AGEP Scholars Seminar*, Ann Arbor, MI, USA (03/2010)
6. "The graduate school experience" Invited panel discussant , *The Leadership Alliance National Symposium*, Chantilly, VA, USA (07/2009)
7. "Gradient coils for high resolution Nuclear Magnetic Resonance Imaging" , *Urban University Series Conference*, City College of New York, USA (05/2006)
8. "Gradient coils for high resolution Nuclear Magnetic Resonance Imaging", *McNair scholars meeting*, York College, NY, USA (04/2006)

### Poster presentations

9. "Angular Kapitza-Dirac scattering using optical vortices", Y.S Rumala, A.E. Leanhardt, Poster presentation, *Midwestern Cold Atoms Workshop*, Chicago, IL, USA (11/2009)
10. "Atom optics and quantum optics with a ytterbium atomic gas", E. A. Alden, Y.S Rumala, A.E. Leanhardt, Poster presentation, *Gordon Conference on Atomic Physics*, Tilton, NH, USA (05/2009)
11. "Construction of a Yb Laser Cooling and Trapping Apparatus", Y.S. Rumala, E.A. Alden, A.E. Leanhardt, Poster presentation, *Midwestern Cold Atoms Workshop*, Argonne, IL, USA (11/2008)
12. "Construction of a Yb Laser Cooling and Trapping Apparatus", Y.S. Rumala, C Li, A.E. Leanhardt, Poster presentation, *Michigan Quantum Summer School*, Ann Arbor, MI, USA (06/2008)
13. "A search for non-newtonian gravity with ultracold atoms" Y.S. Rumala, A. E. Leanhardt. *Frontiers in Optical Coherent and Ultrafast Science (FOCUS) Center Seed Funding meeting*, Ann Arbor, MI, (2007)
14. "Finite pulse width artifact suppression in spin-1 quadrupolar echo spectra by phase cycling" E.S. Mananga, Y.S. Rumala, G.S. Boutis. Poster presentation, *ASEE Mid Atlantic conference*, New York, USA (04/2006)
15. "Development of a strong magnetic field gradient for q-space NMR imaging" Y.S. Rumala, E.S. Mananga, G.S. Boutis., Poster presentation, *9th Annual CUNY Conference in Science and Engineering*, New York, USA (02/2006) - *Certificate of presentation achievement award*
16. "Concepts for building a carbon nanotube grip and release device for small-scale particles" Y.S. Rumala, M.L. Culpepper, Poster presentation, *National Society of Black Physicists (NSBP) Annual conference*, California, USA (02/2006)
17. International Symposium on NanoManufacturing, Limassol, Cyprus (10/2005)
18. "Solving Mathematical Problems: *stated equatiorn*", Y. Rumala, F. Mawyer, Poster presentation, *A Gathering of Science Scholars II National Conference*, New York, USA (03/2005) - *Second place poster award*

19. "Solving Mathematical Problems: *stated equation*" Y.S. Rumala, F. Mawyer, Poster presentation, *The 12<sup>th</sup> Annual Florida-Georgia LSAMP Expo*, UCF, Florida, USA (01/2005) – *First place poster award*
20. "Quantum Cascade lasers: temperature performance and liquid-surface cooling" Y.S. Rumala, C.F. Gmachl, D.L. Sivco, Poster presentation, *Leadership Alliance National Symposium*, Chantilly, VA, USA (8/2004)

### Research and work experience:

#### Department of Physics, University of Michigan, Ann Arbor (08/2007 – present)

Advisor: Prof. Aaron Leanhardt

- Set up Atomic, Molecular and Optical (AMO) physics lab from scratch
- Design and construction of apparatus (Zeeman slower, Ultra-high vacuum etc)
- Laser spectroscopy of atomic Ytterbium.
- Studying the spatial structure of optical vortex photons for angular diffraction of ultra-cold atoms and optical frequency metrology

#### Ion Trap Quantum Computing lab, Department of Physics, University of Michigan, (08/2006 - 08/2007)

Advisor: Prof. Christopher Monroe

- Used light fields to cool cadmium ions, and then trapping them in a time averaged radio frequency potential for the purpose of studying factors that contribute to anomalous heating in ion traps.

#### Department of Natural Sciences, Physics, York College of CUNY (09/2005 - 06/2006)

Supervisor: Prof. Gregory Boutis

- Developed strong linear magnetic field gradients for high resolution q-space Nuclear Magnetic Resonance (NMR) imaging (honors thesis work).
- Performed calculations involving pulse sequence development to suppress unwanted artifacts, and enhance the signal to noise ratio in spin-1 quadrupolar echo spectra using Average Hamiltonian theory.

#### Academic Achievement Center, York College of CUNY (08/2003 – 05/2006)

*College assistant/tutor*

- Worked 10 hours a week during the semester tutoring students in various introductory mathematics and physics courses, and assisted in assignment problems.

#### Precision Compliant Systems Lab, Department of Mechanical Engineering, MIT, (06/2005 - 08/2005)

Supervisor: Prof. Martin Culpepper

- Explored concepts to design a "stick free" gripper out of carbon nanotubes that will have the capability to grip nano scale particles, and release the particles at a prescribed location.
- In October of 2005, invited back to the PCS lab to participate in the student design project in which we engineered a NanoManipulator that is capable of racing through a 30 by 30 micron virtual track, and then sponsored abroad to the November 2005 *International Symposium on NanoManufacturing* at Limassol, Cyprus.

#### Department of Electrical Engineering, Princeton University, (06/2004 - 08/2004)

Supervisor: Prof. Claire Gmachl

- Design and testing of a high thermal efficiency semiconductor laser package and characterization of quantum cascade lasers to determine their core temperature and effective means to cooling a laser array for better performance.

#### Department of Mathematics and Computer Studies, York College, (02/2004 - 06/2005)

Supervisor: Prof. Farley Mawyer

- Solving mathematical problems from various journals of interest (such as The College Mathematics Journal (CMJ), Math Horizons etc).