

# CURRICULUM VITAE OF RALPH F. TATE

## I. PROFESSIONAL AFFILIATION AND CONTACT INFORMATION

### A. Present University Department or Unit:

School of Information Systems and Applied Technologies (ISAT)  
College of Applied Sciences and Arts

### B. Office Address:

College of Applied Sciences and Arts  
Mail Code 6614  
1365 Douglas Drive, Room ASA120  
Southern Illinois University  
Carbondale, IL 62901-6614  
Phone: (618) 453-8878  
E-Mail: [rtate@siu.edu](mailto:rtate@siu.edu)

## II. EDUCATION

### A. Formal:

M.S.	Master of Science in Electrical Engineering Air Force Institute of Technology, Dayton, OH Thesis: "Steady-State Production and Quenching of Br( <sup>2</sup> P <sub>1/2</sub> )".	1991
B.S.	Bachelor of Science in Electrical Engineering Southern Illinois University Edwardsville, IL	1986

### B. Continuing:

February 2004	Teaching with Technology Workshop, SIUC, IL
November 2003	Grant Writing Workshop, ORDA, SIUC, IL
September 2003	Writing and Critical Thinking Workshop, SIUC, IL
July 2000	Optical System Design Short-Course, Albuquerque, NM
November 1997	Physical Optics Analysis using GLAD, Tucson, Arizona

### III. PROFESSIONAL EXPERIENCE

#### **Southern Illinois University (Carbondale, IL)**

2003-Present

School of Information Systems and Applied Technologies

College of Applied Sciences and Arts

Assistant Professor

- Teach Undergraduate courses:
  - *Introduction to Electronics, EST-100*
  - *DC/AC Circuit Analysis, EST-101*
  - *DC/AC Circuit Analysis Laboratory, EST-111*
  - *Electronic Circuits, EST-102*
  - *Electronic Circuits Laboratory, EST-112*
  - *Introduction to Electronic Communications, EST-221*
  - *LAN Installation and Administration, ISAT-224*
  - *Optical Electronics, EST-302*
  - *Communication Systems (lecture/lab), EST-304*
  - *Advanced Communication Systems (lecture/lab), EST-414*
  - *Current Trends in Electronics Management, EST-451*
- Conduct Research on applications of wireless sensor networks in collaboration with Agricultural Systems and Informatics, Southern Illinois University Carbondale.
- Conduct research in photonics education for technicians and optical methods of sound detection (independent research efforts).
- Develop and teach off-campus *Optical Electronics* course at 4 military bases.
- Perform service and committee work.

#### **Air Force Research Laboratory (Albuquerque, NM)**

1998-2003

Solid-State Laser Group

Directed Energy Directorate

Senior Research Scientist/Engineer

- Managed technology development contracts with several defense contractors in area of high-power fiber lasers.
- Directed research group investigating power scaling of fiber lasers through novel optical pumping schemes.

**Air Force Research Laboratory (Albuquerque, NM)** 1993-1998  
Chemical Laser Group  
Directed Energy Directorate  
Research Scientist/Engineer

- Investigated RF-pumped carbon monoxide lasers
- Investigated magnetic properties of atomic iodine.
- Designed and developed sophisticated laser diagnostics to probe the gain of a chemical oxygen-iodine laser system.

**U.S. Air Force (San Bernardino, CA)** 1992-1993  
Ballistic Missile Office  
Developmental Engineer

**Air Force Phillips Laboratory, (Albuquerque, NM)** 1986-1990  
Chemical Laser Branch  
Developmental Engineer

**Albuquerque Technical-Vocational Institute (Albuquerque, NM)** 1987-1990  
Instructor (part-time)

- Taught undergraduate courses: *C Programming and Introduction to Data Processing.*

**U.S. Air Force Keesler AFB (Biloxi, MS)** 1980-1983  
Ground Radar Systems School  
Technical Instructor

#### **IV. RESEARCH AND CREATIVE ACTIVITY**

##### **A. Interests and Specialties:**

- Wireless sensor networks
- Optical methods for acoustic wave detection
- Virtual instrumentation in education
- LabVIEW programming for data acquisition and control
- Photonics education
- Fiber lasers and applications

##### **B. Current Projects:**

- Investigation of wireless sensor networks for agricultural applications.
- Integration of virtual instrumentation (LabView) in the EST curriculum.
- Development and demonstration of optical microphone technology.

### **C. Grants Applied For:**

Woodward, B., Hebel, M., **Tate, R.F.** (2006), *Revitalizing the Heartland Through Network Technology Intellectual Exchange*, Funded by NSF, CPATH grant.

**Tate, R.F.** (2004-2007). Energy Related Laboratory Equipment Grants. Funded by U.S. Department of Energy.

**Tate, R.F.** (2004). *Analysis and Demonstration of an Optical Microphone*. Funded by Faculty Seed Grant, ORDA, SIUC. Requested \$14,000.

**Tate, R.F.** (2004). *Investigation of Need for Photonics Technicians*. Funded by College of Applied Sciences and Arts, SIUC.

### **D. Grants Received:**

**Tate, R.F.** (2004-2007). Energy Related Laboratory Equipment Grants. Funded by U.S. Department of Energy. (\$50,000 in equipment grants)

**Tate, R.F.** (2004). *Analysis and Demonstration of an Optical Microphone*. Funded by Faculty Seed Grant, ORDA, SIUC. (\$12,000)

**Tate, R.F.** (2004). *Investigation of Need for Photonics Technicians*. Funded by College of Applied Sciences and Arts, SIUC. (One month salary)

### **E. Honors and Awards:**

Awarded "Departmental Teacher of the Year, 2007" School of Information Systems and Applied Technologies, Southern Illinois University Carbondale.

Commandant's Award for Exceptional Thesis Research, Air Force Institute of Technology, Dayton, Ohio. December 1991.

### **F. Papers and Presentations at Professional Meetings:**

**Tate, R. F.**, Woodward, B. S., Ashby, S. C., Hebel, M. A. (2008, October). *Soft skills development through project-based learning in the information technology classroom*. Accepted for presentation at the International Association of Computer Information Systems, Savannah, GA.

**Tate, R. F.**, Hebel, M. A., Watson, D. G. (2008, June). *WSN link budget analysis for precision agriculture*. Paper presented at the 2008 Annual International Meeting, American Society of Agricultural and Biological Engineers, Providence, RI.

- Rocchitta, G., **Tate, R. F.**, Migheli, R., Bazzu, G., Calia, G., Puggioni, G., et al. (2008, May). *Development of a new integrated amperometric-biotelemetric system for real-time detection of lactate in vitro and potentially in vivo*. Poster session presented at the 43rd International Symposium of Nutripharm and Biosecurity, Alghero, Sardinia, Italy.
- Hebel, M. A., **Tate, R. F.**, Watson, D. G. (2007, June). *Results of wireless transceiver testing for agricultural applications*. Paper presented at the 2007 Annual International Meeting, American Society of Agricultural and Biological Engineers, Minneapolis, MN.
- Hebel, M., **Tate, R. F.** (2007, February). *Reinforcing control system, data communications, and RF theory using wireless sensor network devices*. Paper presented at the American Technical Educator's Association 44<sup>th</sup> National Conference, Atlanta, GA.
- Tate, R. F.** (2006, March). *Photonics in manufacturing*. Paper presented at the American Technical Educator's Association, 43<sup>rd</sup> National Conference, Louisville, KY.
- Seleznev, L. V., Bohn, W., Von Bulow, H., Dass, S., Hager, G. D., Ionin, A. A., Klimachev, Yu. M., Kotkov, A. A., McIver, J. K., McCord, J. E., **Tate, R. F.** (2006). Fundamental and overtone band lasing in RF discharge supersonic CO laser. *Proceedings of the Society of Photo-optical Instrumentation Engineers - International Conference on Lasers, Applications, and Technologies 2005: High-Power Lasers and Applications*, St. Petersburg, Russian Federation, 6053, 081-086. doi:10.1117/12.660055
- Bohn, W., Von Bulow, H., Dass, S., Hager, G. D., Ionin, A. A., Klimachev, Yu. M., Kotkov, A. A., McCord, J. E., McIver, J. K., Seleznev, L. V., Sinitsyn, D. V., **Tate, R. F.** (2006). Supersonic overtone CO laser: Research and development. *Proceedings of the Society of Photo-optical Instrumentation Engineers - Atomic and Molecular Pulsed Lasers VI*, Tomsk, Russian Federation, 6263, 31- 36. doi:10.1117/12.677387
- Tate, R. F.** (2005, October). *Cost effective electronics laboratory equipment upgrade using virtual instrumentation*. Paper presented at the American Technical Educator's Association, Great Lakes Regional Conference, Peoria, IL.
- Tate, R. F.** (2005, October). *Photonics in manufacturing: What every technician should know*. Paper presented at the American Technical Educator's Association, Great Lakes Regional Conference, Peoria, IL.

- McCord, J. E., **Tate, R. F.**, Dass, S., Hager, G. D., Ionin, A. A., Seleznev, L. V., et al. (2004). Supersonic RF discharge CO laser operating in fundamental ( $\Delta=1$ ) and overtone ( $\Delta=2$ ) spectral bands. *Proceedings of the Society of Photo-optical Instrumentation Engineers - High-Power Laser Ablation V*, Taos, NM, 5448, 183-188. doi:10.1117/12.568353
- Meyers, J., Wu, R., Chen, T., Myers, M., Hardy, C., Driver, J., **Tate, R.** (2003). New high-power rare-earth-doped fiber laser materials and architectures. *Proceedings of the Society of Photo-optical Instrumentation Engineers – Advances in Fiber Lasers*, San Jose, CA, 4974, 177. doi:10.1117/12.484168
- McCord, J., **Tate, R.**, Hager, G., Ionin, A., Seleznev, L., Dass, S., et al. (2000, December). *Supersonic RF discharge CO Laser: multi-line and single-line spectral characteristics*. Paper presented at the 2000 International Conference on Lasers, Albuquerque, NM.
- Nikolaev, V. D., Zagidullin, M. V., Svistun, M. I., Anderson, B. T., **Tate, R. F.**, Hager, G. D. (2000, December). *The temperature dependence of pressure broadening of  $^2P_{1/2} - ^2P_{3/2}$  transition of atomic iodine*. Paper presented at the 2000 International Conference on Lasers, Albuquerque, NM.
- Hager, G. D., Anderson, B. T., Kendrick, K. R., **Tate, R. F.**, Helms, C. A., Adler, R. J., et al. (2000). Progress report on the development of a repetitively pulsed frequency shifted COIL laser. *Proceedings of the Society of Photo-optical Instrumentation Engineers - High-Power Laser Ablation III*, Santa Fe, NM, 4065, 646-657. doi:10.1117/12.407385
- Tate, R. F.**, Harris, M., Anderson, B. T., Hager, G. D. (2000). Short-pulsed photolytic iodine laser. *Proceedings of the Society of Photo-optical Instrumentation Engineers - High-Power Laser Ablation III*, Santa Fe, NM, 4065, 658-665. doi:10.1117/12.407386
- Brown, A. J., Norsen, M., Fisher, C., Leuchs, M., **Tate, R. F.**, Harris, M., et al. (2000). Injection seeding of a high-energy, photolytically pumped I\* laser. *Proceedings of the Society of Photo-optical Instrumentation Engineers - High-Power Laser Ablation III*, Santa Fe, NM, 4065, 666-674. doi:10.1117/12.407387
- Fisher, C. H., Leuchs, M. P., Romea, R. D., Brown, A. J., Norsen, M., **Tate, R. F.** et al. (2000). Raman conversion of a high-energy photolytically pumped I\* laser. *Proceedings of the Society of Photo-optical Instrumentation Engineers - High-Power Laser Ablation III*, Santa Fe, NM, 4065, 675-682. doi:10.1117/12.407388

- Henshaw, T. L., Madden, T. J., Herbelin, J. M., Manke II, G. C., Anderson, B. T., **Tate, R. F.**, Hager, G. D. (1999). Measurement of gain on the 1.315- $\mu\text{m}$  transition of atomic iodine as produced from the  $\text{NCl}(a^1\Delta) + \text{I}(^2\text{P}_{3/2})$  energy transfer reaction. *Proceedings of the Society of Photo-optical Instrumentation Engineers - Gas and Chemical Lasers and Intense Beam Applications II*, San Jose, CA, 3612, 147-157. doi:10.1117/12.350650
- Tate, R. F.**, Anderson, B. T., Keating, P. B., Hager, G. D. (1998). Zeeman spectra of atomic iodine in a 0- to 400-gauss **B** field. *Proceedings of the Society of Photo-optical Instrumentation Engineers - Gas and Chemical Lasers and Intense Beam Applications*, San Jose, CA, 3268, 115-124. doi:10.1117/12.308057
- Tate, R. F.**, Hunt, B. S., Hager, G. D., Helms, C. A., Truesdell, K. A. (1994). Two-dimensional gain measurements in a chemical oxygen-iodine laser (COIL) device. *Proceedings of the Society of Photo-optical Instrumentation Engineers - Gas Flow and Chemical Lasers: Tenth International Symposium*, Friedrichshafen, Federal Republic of Germany, 2502, 272. doi:10.1117/12.204923
- Tate, R. F.**, Hunt, B. S., Hager, G. D., Helms, C. A., Truesdell, K. A. (1994, June). *Two-dimensional gain measurements in a COIL device*. Paper presented at the American Institute of Aeronautics and Astronautics 25th Plasmadynamics and Lasers Conference, Colorado Springs, CO.
- Tate, R. F.**, Hunt, B. S., Hager, G. D., Helms, C. A., Truesdell, K. A. (1994). Two dimensional gain measurements on a chemical oxygen iodine laser. *Proceedings of the International Conference of LASERS '93*, Lake Tahoe, NV, 179, 609-615.
- Johnson, R. O., Katapski, S. M., **Tate, R. F.**, Roh, W. B., Perram, G. P. (1993). Spin-orbit relaxation of  $\text{Br}(^2\text{P}_{1/2})$ . *Proceedings of the International Conference on LASERS '92*, Houston, TX, 178.
- Tate, R. F.**, Perram, G. P., Roh, W. B. (1991, October). *Spin-orbit relaxation in atomic bromine*. Paper presented at the Ohio Sectional Meeting of the American Physical Society, Dayton, OH.

## V. PUBLICATIONS AND CREATIVE WORKS

### A. Books:

### B. Articles in Professional Journals:

- Tate, R. F.** (2007). Photonics in manufacturing. *American Technical Educator's Association Journal*, 34(2), 12-14.

- Tate, R. F.** (2005). Lecture enhancement through visualization using virtual instrumentation. *American Technical Educator's Association Journal*, 33(1), 18-21.
- Bohn, W., Von Bulow, H., Dass, S., Ionin, A. A., Klimachev, Y. M., Kotkov, A. A., McIver, J. K., McCord, J. E., Seleznev, L. V., Sinitsyn, D. V., **Tate, R. F.**, Hager, G. D. (2005). High-power supersonic CO laser on fundamental and overtone transitions. *Quantum Electronics*, 35(12), 1126-1130.
- Nikolaev, V. D., Zagidullin, M. V., Svistun, M. I., Anderson, B. T., **Tate, R. F.**, Hager, G. D. (2002). Results of small-signal gain measurements on a supersonic chemical oxygen iodine laser with an advanced nozzle bank. *Institute of Electrical and Electronics Engineers Journal of Quantum Electronics*, 31(9), 421-428.
- Zagidullin, M. V., Nikolaev, V. D., Svistun, M. I., Khvatov, N. A., Anderson, B. T., **Tate, R. F.** (2001). Amplification and gas-dynamic parameters of the active oxygen-iodine medium produced by an ejector nozzle unit. *Quantum Electronics*, 31(8), 678-682.
- Tate, R.F.**, Anderson, B.T., Keating, P.B., Hager, G.D. (2000). Diode-laser zeeman spectroscopy of atomic iodine. *Journal of the Optical Society of America, B: Optical Physics*, 17(7), 1271-1278.
- Herbelin, J. M., Henshaw, T. L., Rafferty, B. D., Anderson, B. T., **Tate, R. F.**, Madden, T. J., et al. (1999). The measurement of gain on the 1.315 micron transition of atomic iodine in a subsonic flow of chemically generated NCl. *Chemical Physics Letters*, 299, 583-588.
- Tate, R.**, Gurley, K., McIver, J., Hager, G. (1995). Dynamics of a mode-locked low-pressure photolytic I\* laser. *Institute of Electrical and Electronics Engineers Journal of Quantum Electronics*, 31(11), 1910-1911.
- Tate, R. F.**, Hunt, B. S., Helms, C. A., Truesdell, K. A., Hager, G. D. (1995). Spatial gain measurements in a chemical oxygen iodine laser (COIL). *Institute of Electrical and Electronics Engineers Journal of Quantum Electronics*, 31(9), 1632-1636.
- Nicholson, J., Rudolf, W., McIver, J., **Tate, R.**, Hager, G. (1995). Dynamics of low-pressure gain-switched iodine lasers. *Applied Physics Letters*, 67(4), 464-466, DOI:10.1063/1.114537.

#### **C. Creative Contributions:**

#### **D. Chapters in Professional Books:**

**E. Popular and Creative Writing:**

**F. Book Reviews:**

**G. Other:**

**VI. TEACHING EXPERIENCE**

**A. Teaching Interest and Specialties:**

Wireless Sensor Networks  
Electronic Communication Systems  
Data Acquisition and Control Systems  
Applied Photonics

**B. Teaching and Training Grants:**

None

**C. Teaching Awards and Honors:**

Awarded "Departmental Teacher of the Year, 2007" School of Information Systems and Applied Technologies, Southern Illinois University Carbondale.

**D. Other: Curriculum Development/Revision**

Revised EST 304, Communications Systems, as a lecture/lab course and developed laboratory exercises (2006)

Developed EST 224, Introduction to Electronic Communications, (2006)

Developed EST 414, Advanced Communication Systems, (2006-2007)

Developed on-line (Blackboard) material for EST 101, EST 102, EST 221, EST 302, EST 304, EST 414, and ISAT 224 (2004-2008)

**VII. UNIVERSITY EXPERIENCE**

**A. Department Committees:**

Chair, ISAT Scholarship Committee, 2007-2008

Member, EST Curriculum Committee, 2005-2006

Member, ISAT Equipment Committee, 2003- 2006

Member, Ad Hoc Department Chair Search Committee, 2004

**B. College and University Committees and Councils:**

Chair, College Honors Committee, 2007-2008

Member, College Honors Committee, 2004-Present

Representative, Open House for Southern Illinois University Carbondale, 2004-2008.

**VIII. PROFESSIONAL SERVICE**

**A. Membership in Professional Associations:**

IEEE Computer Society, 2007-present

Optical Society of America (OSA), 2007-present

American Technical Educator's Association (ATEA), 2005-present

International Society for Optical Engineering (SPIE), 2000-2001

Directed Energy Professional Society, 2000-2001

**B. Evaluation of Manuscripts for Journals and Book Publishers and of Grant Proposals for Agencies:**

Pu Zhou, Xiaolin Wang, Zilun Chen, Xiao Li, Zejin Liu, Xiaojun Xu, Jing Hou, and Zongfu Jiang (2008). Coherent combining of two pulsed fiber lasers in a phase modulated mutually coupled fiber laser array. Pending publication in *Optics Letters*.

Sumetsky, M. (2006). How thin can be a microfiber be and still guide light? *Optics Letters*, 31(7), 870-872.

Polynkin, A., Polynkin, P., Schülzgen, A., Mansuripur, M., Payghambarian, N. (2005). Single-frequency laser oscillator with watts-level output power at 1.5  $\mu\text{m}$  by use of a twisted-mode technique. *Optics Letters*, 30(20), 2745-2747.

Kim, H., Kin, J., Paek, U., Lee, B. H., Kim, K. T. (2004). Tunable photonic crystal fiber coupler based on a side-polishing technique. *Optics Letters*, 29(15), 1194-1196.

Fu, L. B., Selvas, R., Ibsen, M., Sahu, J. K., Jang, J. N., Alam, S. U. et al. (2003).  
Fiber-DFB laser array pumped with a single 1W CW Yb-fiber laser.  
*Institute of Electrical and Electronics Engineers Photonics Technology  
Letters*, 15(5), 655-657.

## **IX. COMMUNITY SERVICE**

Co-Director, *Advanced and Beginning Robotics Camp*, SIUC Division of  
Continuing Education, June-July 2008

Invited Instructor, *Workshop on Implementing Wireless Sensor Networks*, American  
Society of Agricultural and Biological Engineers Annual International Meeting,  
June 2008

Instructor, *College of Applied Sciences and Arts Career Day, Educational Talent  
Search 101*, June 2008

Invited Lecturer, *Lasers and Optics*, Carterville High School, May 2008

Invited Performer, *Celebration to Honor Dr. Martin Luther King, Jr.*, Carbondale  
Civic Center, January 2008

Instructor, *College of Applied Sciences and Arts Career Day, Shawnee Community  
Technology Event*, June 2007

Invited Lecturer, *Introduction to Electricity and Magnetism*, Carterville High  
School, 2006

Instructor, *Electronics and Robotics Workshops*, Carbondale Boys and Girls Club,  
2006