

## **Timothy A. Heumier, PhD**

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### **SUMMARY OF EXPERIENCE**

- Over 20 years of teaching physics and applying physics principles to solution of problems from industrial magnetism to laser diodes to optical fiber telecommunications to food webs
- Broad experience teaching undergraduate physics, astronomy and physical science courses and labs.
- Extensive experience with wide range of instructional and research lab equipment
- Excellent oral, written and interpersonal communications skills
- Motivated team player who values diverse relationships and experiences

### **EXPERIENCE**

#### **Assistant Professor of Math/Physics: Spring 2003 to present**

Azusa Pacific University, Azusa, CA

- *Taught college algebra and applied calculus*
- *Taught various introductory and upper division physics, physical science and astronomy*
- *Taught the Science module in the Human Development program*
- *Received institutional research grant for investigation of thermal transpiration*

#### **Adjunct Physics Lecturer: Fall 2002**

Azusa Pacific University, Azusa, CA

- *Taught junior-level Electrical Circuits*

California State University at Channel Islands, Camarillo, CA

- *Taught Physical Science for Multi-Subject Teachers; developed lab curriculum for course*

#### **Senior Photonics Engineer/Staff Test Engineer: 2000-2002**

**Intel Corporation, Calabasas Design Center, Calabasas, CA**

- Directed design validation preparation for testing latest high-speed communications chips (TIA, LIA, modulator driver) including development of heterodyned laser optical sine wave source for O-E measurements
- Served as Laboratory Safety Coordinator; responsible for laser safety, hazardous wastes

#### **Cognet Microsystems, Inc. (acquired by Intel in 2001)**

- Collaborated in design of CWDM module, including optical design
- Put together a high-resolution machine vision system and a micron-scale motion system for fabricating and testing module prototypes
- Designed system to aid alignment of laser beam to detectors in optical link test setup
- Carried out preliminary calculations on optical feedback into DFB laser from Si; measured relative intensity noise of laser when fiber coupled

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### **Consultant: 1997-2000**

#### **Optimal Solutions, Spokane, WA**

- Researched DWDM issues for client, bringing to bear advanced knowledge of optical physics
- Carried out photon time-of-flight and polarization optics calculations for novel test instrument
- Developed low-cost technique for measuring magnetism in springs; made recommendations that resulted in resolving a critical situation with the manufacturer's 2<sup>nd</sup> largest client, increasing 6 month sales by 25%.
- Resolved laser barcode scanner problems for Veterans Affairs Medical Center

### **Assistant Professor of Physics: 1996-1997**

#### **Tri-State University, Angola, IN**

- *Taught undergraduate physics*
- *Revised lab curriculum, introducing and improving optical experiments*

### **Assistant Professor of Physics: 1993-1996**

#### **Gonzaga University, Spokane, WA**

- *Developed holography course; taught broad range of physics and astronomy*
- *Revised and updated lab experiences*
- Involved in interdisciplinary laser-based research
- Conducted research on amount and effect of optical feedback into laser diodes from collimating optics; designed optical system and fabricated lab devices using shop equipment

### **Graduate Assistant: 1987-1993**

#### **Montana State University, Bozeman, MT**

- Designed and implemented computer control of laser diode test equipment to study mode hopping in laser diodes. Found important stability patterns relating to laser case temperature and drive current (see Application Note in publications list).
- Developed and used method to overcome low resolution of spectrograph, saving hundreds of dollars in new equipment.
- Instrumental in success of MSU/ILX Lightwave Inc. collaboration.
- *Taught trig-based freshman physics lecture course*

### **Instructor: 1980-1987**

#### **Angelo State University, San Angelo, TX**

- *Taught broad range of physics, *physical science* and astronomy*
- Designed and carried out experiment on Crookes' radiometer using available University equipment

### **Graduate Assistant: 1974-1980**

#### **University of Arkansas, Fayetteville, AR**

- Designed electron gun, assembled and used high vacuum system to conduct spectrographic analysis of VUV light emitted from 100 keV electron impact on metals
- *Taught physical science for elementary education majors (combined lecture/lab course)*

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### **EDUCATION**

Ph.D., Physics, Montana State University, Bozeman, MT, 1992

Dissertation title: Mode Hopping in Semiconductor Lasers

M.S., Physics, University of Arkansas, Fayetteville, AR, 1978

Thesis title: Scalable Standard Optical Sources in the Vacuum Ultraviolet: Emissions from Electron Impact on Metals

B.S., Physics, Angelo State University, San Angelo, TX, 1973

Assisted in study of low-energy (1-10 keV) proton exchange processes in hydrogen

### **PROFESSIONAL AFFILIATIONS**

Optical Society of America                      Sigma Pi Sigma (physics honor society)

American Association of Physics Teachers

### **PUBLICATIONS/PRESENTATIONS**

T.A. Heumier, The Longest Day: A Geometrical Calculation. Poster presentation at winter national meeting of AAPT, February 15, 2009, Chicago, IL.

T.A. Heumier, Mystery of the Light Bulb: Why Half the Current Is Not Half As Bright. Poster presentation at winter national meeting of AAPT, February 15, 2009, Chicago, IL.

Jürgen Ziesmann, T Heumier (2009) Eye development in the termite *Incisitermes minor* – morphology and electrophysiology. 93rd Annual Meeting of the Pacific Branch Entomological Society of America, San Diego, USA, March/April 2009

T.A. Heumier and Jonathan Staben, Optical feedback in semiconductor lasers from collimating lenses, Optical Society of America fall national meeting, Portland, OR, September 11, 1995

T.A. Heumier and Jonathan Staben, The Effect of Optical Feedback from Collimating Lenses on Laser Diodes: poster presented at Murdock College Science Conference, Gonzaga University, Spokane, Washington (November, 1994).

T.A. Heumier and J.L. Carlsten, Detection of mode hopping in semiconductor lasers by monitoring intensity noise: IEEE Journal of Quantum Electronics 29, pp. 2756 (1993).

T.A. Heumier and J.L. Carlsten, Mode hopping in semiconductor lasers, poster session at Optical Society of America annual meeting, San Jose, CA (November 7, 1991).

T.A. Heumier and J.L. Carlsten, Mode hopping in semiconductor lasers, Application Note No. 8, ILX Lightwave Corporation (1992).

[http://www.ilxlightwave.com/appnotes/mode\\_hopping\\_semiconductor\\_lasers.pdf](http://www.ilxlightwave.com/appnotes/mode_hopping_semiconductor_lasers.pdf)

Kenneth Schoenly, R.A. Beaver and T.A. Heumier, On the trophic relations of insects: A food-web

approach, *American Naturalist* 137, 597-638 (1991).

T.A. Heumier, A little-known effect in Crookes' radiometer, national meeting of American Association of Physics Teachers, Ashland, OR (1982).

R.H. Hughes, T.A. Heumier and P.M. Griffin, VUV and soft x-ray optical emissions from electron impact on metals, *Applied Optics* 20, 1350 (1981).

**Timothy A. Heumier****Courses Taught (L means I taught the lab associated with the course)**

Physical Science (2 semesters) L

Physical Science for Elementary Teachers (2 semesters) L

Teaching Physical Science in the Public Schools (2 semesters) L

Fundamentals of Astronomy L

Astronomy of the Solar System L

Holography (with integrated lab)

Algebra-based Introductory Physics (2 semesters) L

Trig-based Introductory Physics (2 semesters) L

Calculus-based Introductory Physics (2 semesters) L

Modern Physics

Classical Mechanics (2 semesters)

Electrodynamics (2 semesters)

Optics Laboratory

Intermediate Laboratory (emphasis on statistical analysis of data)

Electrical Circuits (integrated lecture and lab)

Humans and Scientific Inquiry (degree completion science course for adult learners; integrated lecture and lab)

College Algebra

Applied Calculus (for business and biology majors)

Humans and Scientific Inquiry L