# Patrick J. Neyman

304 Apartment Heights Drive #F-4, Blacksburg, Virginia 24060 pneyman@vt.edu (540) 953-3968


**EDUCATION:** **M. S. Materials Science & Engineering, May 2002**
Virginia Polytechnic Institute & State University
Thesis: *Nonlinear Optical Properties and Structural Characteristics of Self-Assembled Nanoscale Polymer Films by Ionic Concentration and Incorporation of Monomer Chromophores*

**B. S. Physics, May 1999**
Virginia Polytechnic Institute & State University
Minor: Mathematics
Emphasis in Computer Science

**ACADEMIC HONORS:**

- *Sigma Pi Sigma* Honor Society of the American Institute of Physics (1999)
- *Phi Theta Kappa* Honor Society (1996)
- Lubna Ijaz Scholarship for Commitment and Service to Physics (1998)

**SELECTED EXPERIENCE:**

1997 – Present **Nonlinear Optics Laboratory**, **Department of Physics**, **Virginia Tech**, **Blacksburg**, **Virginia**

- Operated nanosecond and picosecond Nd:YAG laser systems
- Developed software for data acquisition, using C
- Analyzed and fabricated nanoscale self-assembled polymer thin films for electro-optics
- Fabricated photo-diodes and light emitting diodes using fullerene-polymer thin films
- Sponsored by the *National Science Foundation*

1999 **Luna Innovations**, **Blacksburg**, **Virginia**

- Fabricated and characterized thin films for electro-optic applications

1997 – 1998 **Department of Computer Science**, **Virginia Tech**, **Blacksburg**, **Virginia**

- Designed Physics web site for the *Networked Infrastructure for Education* project
- Sponsored by the *National Science Foundation*

1990 – 1993 **Special Products and Integrated Services**, **Framatome**, **Lynchburg**, **Virginia**
Non-Destructive Evaluation (NDE): Eddy-Current Testing (ET)

- Certified ET Level II: *American Society for Non-Destructive Testing* SNT-TC-1A
- Certified ET Level I: *Canadian General Standards Board* CAN/CGSB-48.9712
- Inspected thin walled tubing in steam generators at several nuclear power plants
- Supervised by the *United States Nuclear Regulatory Commission* and the *Canadian Ministry of Natural Resources*

**MILITARY:** **82nd Airborne Division**, **U. S. Army**, **Fort Bragg**, **North Carolina**
Squad Leader, Airborne Infantry, 1986-1990, 1991

- Participated in Operation Desert Storm and Operation Just Cause
- Managed, trained and directed work assignments for nine personnel
- Graduated with honors from the Non-Commissioned Officer Academy

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## RELATED EXPERIENCE:

### Graduate Instructing Experience:

- *Optics Laboratory*, Senior Physics
- *Electronics Laboratory*, Junior Physics
- *Astrophysics*, Junior Physics
- *Electricity and Magnetism Laboratory*, Sophomore Physics
- *Mechanics Laboratory*, Sophomore Physics

### Relevant Graduate Coursework:

Adhesion Science, Polymer Viscoelasticity, Polymer Fracture and Deformation, Macromolecular Synthesis and Characterization Laboratory, X-Ray Diffraction, Mechanical Behavior of Materials, Advanced Materials Thermodynamics, Nonlinear Optics, Quantum Electronics, Quantum Mechanics, Electrodynamics

### Selected Equipment Proficiency:

Nd:YAG laser systems using nanosecond and picosecond solids state lasers, Optical system design, Photo-diode evaluation system design, Electronic evaluation system design, Lock-in amplifiers, CAMAC systems, Spectrometers, Spectrophotometers, Pyrometers, Electrometers, Vacuum deposition systems, Spin coating systems, ROGER and COBRA manipulators, MIZ-18 and MIZ-24 data acquisition systems, Computer LAN networks

### Selected Software and Programming Language Proficiency:

- C, C++, Visual C++, UNIX, HTML
- Excel, Word, PowerPoint, Visio, Acrobat, Illustrator, Photoshop, Premier, CorelDraw
- Mathematica, Origin, Psi Plot, Table Curve, Spectra Manager, Standard Analysis, CS ChemDraw, CS Chem3D
- ZETEC SM-10 and SM-20 acquisition and analysis software for NDE

## MEMBERSHIPS:

*American Chemical Society*, since 2000
*Materials Research Society*, since 1999
*Sigma Pi Sigma*, since 1998
*Phi Theta Kappa*, since 1996
*Society of Physics Students*, 1987-2000
*82nd Airborne Division Association*, 1987-1991
*Association of the United States Army*, 1986-1991

## DISTANCE LEARNING:

*Outreach Program*, Virginia Tech, 1997-1999
Mentored rural high-school students in Physics

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**PUBLICATIONS:**

1. **Second-Order Nonlinear Optical Properties of Ionically Self-Assembled Films Containing Dianionic Chromophores**,
   P. J. Neyman, M. T. Guzy, S. Shah, H. Wang, H. W. Gibson, K. E. Van Cott, R. M. Davis, C. Figura, J. R. Heflin,
   *Polym. Mater. Sci. Eng.* (*Am. Chem. Soc.*) **83**, pp. 162-163 (2000).

2. **Thermal Stability and Immersion Solution Dependence of Second Order Nonlinear Optical Ionically Self-Assembled Films**,
   C. Figura, P. J. Neyman, D. Marciu, C. Brands, M. A. Murray, S. Hair, R. M. Davis, M. B. Miller, and J. R. Heflin,
   *SPIE Proc.* **3939**, pp. 214-222 (2000).

3. **In Situ Second Harmonic Generation Measurements of the Formation of Ionically Self-Assembled Monolayers**,
   C. Brands, P. J. Neyman, M. T. Guzy, S. Shah, H. Wang, H. W. Gibson, K. E. Van Cott, R. M. Davis, C. Figura, J. R. Heflin,
   *Polym. Mater. Sci. Eng.* (*Am. Chem. Soc.*) **83**, pp. 219-220 (2000).

4. **Control of Second-Order Nonlinear Optical Susceptibility in Ionically Self-Assembled Films by pH and Ionic Strength**,
   C. Figura, P. J. Neyman, D. Marciu, C. Brands, M. A. Murray, S. Hair, M. B. Miller, R. M. Davis, J. R. Heflin,
   *Mater. Res. Soc. Symp. Proc.* **598**, BB4.9.1-6 (2000).

5. **Photovoltaic Responses in Ionically Self-Assembled Nanostructures Containing Conjugated Polymers And Fullerenes**,
   C. Brands, T. Piok, P. J. Neyman, A. Erlacher, C. Soman, M. A. Murray, R. Schroeder, J. R. Heflin, W. Graupner, D. Marciu. A. Drake, M. B. Miller, H. Wang, H. Gibson, H. C. Dorn, G. Leising, M. Guzy, R. M. Davis,
   *SPIE Proc.* **3937**, pp. 51-62 (2000).

6. **Efficient Charge Generation in Conjugated Molecules**,
   W. Graupner, T. Piok, C. Brands, P. J. Neyman, A. Erlacher, C. Soman, M. A. Murray, R. Schroeder, J. R. Heflin, D. Marciu, A. Drake, M. B. Miller, H. Wang, H. Gibson, H. C. Dorn, G. Leising, M. Guzy, R. M. Davis,
   *Polym. Mater. Sci. Eng.* (*Am. Chem. Soc.*) **83**, pp. 284-285 (2000).

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**PUBLICATIONS:**

7. **Efficiency Optimization in Ionically Self-Assembled Thin Film Polymer Light-Emitting Diodes**,

   D. Marciu, M. B. Miller, A. L. Ritter, M. A. Murray, P. J. Neyman, W. Graupner, J. R. Heflin, H. Wang, H. W. Gibson, R. M. Davis,

   *SPIE Proc.* **3938**, pp. 169-179 (2000).

8. **Characterization of Polymer Light-Emitting Diodes Fabricated by Ionically Self-Assembled Monolayer Technique**,

   D. Marciu, M. B. Miller, J. R. Heflin, M. A. Murray, A. L. Ritter, P. J. Neyman, W. Graupner, H. Wang, H. W. Gibson, R. M. Davis,

   *Mater. Res. Soc. Symp. Proc.* **598,** BB11.50.1-6 (2000).

9. **Second Order Nonlinear Optical Responses of Ionically Self-Assembled Films: Polycation Variations and Dianionic Chromophores**,

   P. J. Neyman, M. Guzy, S. Shah, R. M. Davis, K. E. Van Cott, H. Wang, H. W. Gibson, C. Brands, J. R. Heflin,

   *Linear and Nonlinear Optics of Organic Materials* (*SPIE Proc.*) **4461**, pp. 214-225 (2001) (*Invited*).

10. **Enhanced Second Order Nonlinear Optical Susceptibilities in Ionically Self-Assembled Films Incorporating Dianionic Molecules**,

    P. J. Neyman, M. T. Guzy, S. Shah, H. Wang, H. W. Gibson, K. E. Van Cott, R. M. Davis, C. Brands, J. R. Heflin,

    *Mater. Res. Soc. Symp. Proc.* **660**, JJ8.30.1-6 (2001).

11. **In Situ Second Harmonic Generation Measurements of the Growth of Nonlinear Optical Ionically Self-Assembled Monolayers**,

    C. Brands, P. J. Neyman, M. Guzy, S. Shah, R. M. Davis, K. E. Van Cott, H. Wang, H. W. Gibson, J. R. Heflin,

    *Linear and Nonlinear Optics of Organic Materials* (*SPIE Proc.*) **4461**, pp. 311-318 (2001).

12. **Photovoltaic Cells Based on Ionically Self-Assembled Nanostructures**,

    T. Piok, C. Brands, P. J. Neyman, A. Erlacher, C. Soman, M. A. Murray, R. Schroeder, W. Graupner, J. R. Heflin, D. Marciu, A. Drake, M. B. Miller, H. Wang, H. Gibson, H. C. Dorn, G. Leising, M. Guzy, R. M. Davis,

    *Synthetic Metals* **116** (1-3), pp. 343-347 (2001).

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**PUBLICATIONS:**

13. **In-Situ Measurements of the Growth of the Second-Order Nonlinear Optical Susceptibility in Ionically Self-Assembled Monolayers**,
    C. Brands, J. R. Heflin, P. J. Neyman, M. T. Guzy, S. Shah, H. W. Gibson, K. E. Van Cott, R. M. Davis,
    *Mater. Res. Soc. Symp. Proc.* **660**, JJ8.32.1-6 (2001).

14. **Second-Order Nonlinear Optical Properties of Ionically Self-Assembled Films**,
    H. W. Gibson, M. Guzy, S. Shah, H. Wang, P. J. Neyman, K. Van Cott, R. M. Davis, C. Figura, J. R. Heflin,
    *Polym. Mater. Sci. Eng.* (*Am. Chem. Soc.*) **141** (2001).

15. **Novel Hybrid Covalent / Ionic Self-Assembly Technique for Improved Second-Order Nonlinear Optical Films**,
    P. J. Neyman, M. Guzy, S. M Shah, R. M. Davis, K. E. Van Kott, H. Wang, H. W. Gibson, C. Brands, J. R. Heflin,
    *Mater. Res. Soc. Symp. Proc.* **708**, BB4.4.1.1-6 (2002).

16. **In Situ Measurements of the Formation of Ionically Self-Assembled Monolayers by Second Harmonic Generation**,
    C. Brands, P. J. Neyman, J. R. Heflin,
    *Mater. Res. Soc. Symp. Proc.* **710**, DD12.5.1-6 (2002).

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**REFEREED AND INVITED PRESENTATIONS:**

1. **Control of Second-Order Nonlinear Optical Susceptibility in Ionically Self-Assembled Films by pH and Ionic Strength**,
   *Molecular Electronics*, Materials Research Society Fall Meeting
   (Boston, MA, 30 November 1999).

2. **Second-Order Nonlinear Optical Properties of Ionically Self-Assembled Monolayer (ISAM) Films**,
   *Condensed Matter Seminar*, Department of Physics, Virginia Tech
   (Blacksburg, VA, 10 November 1999)
   (*Invited*).

3. **Second-Order Nonlinear Optical Properties of Ionically Self-Assembled Films Containing Dianionic Chromophores**,
   *Polymer Materials*, American Chemical Society
   (Washington D. C., 20 August 2000).

4. **Characterization of Ionically Self-Assembled Monolayer (ISAM) Films by Second-Order Nonlinear Optical Susceptibility**,
   *Weekly Seminar*, Department of Materials Science and Engineering, Virginia Tech
   (Blacksburg, VA, 27 October 2000)
   (*Invited*).

5. **Enhanced Second-Order Nonlinear Optical Susceptibilities in Ionically Self-Assembled Films Incorporating Dianionic Molecules**,
   *Organic Photonic Materials,* Materials Research Society Fall Meeting
   (Boston, MA, 29 November 2000).

6. **Second Order Nonlinear Optical Responses of Ionically Self-Assembled Films Containing Dianionic Chromophores**,
   *Linear and Nonlinear Optics of Organic Materials*, SPIE
   (San Diego, CA, 2 August 2001)
   (*Invited*).

7. **Novel Polar Self-Assembled Multilayers for Second-Order Nonlinear Optics**,
   *Organic Optoelectronic Materials, Processing, and Devices*,
   Materials Research Society Fall Meeting
   (Boston, MA, 27 November 2001).