Cheyenne J. Sheppard

Instructor of Electrical Engineering
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Education

- **Arkansas State University**, Jonesboro, AR
  Masters of Science, Mathematics, May 2015
  Thesis: *Mathematical Analysis of Continuum Electrodynamics: Implications for the Kinetic Formulation of Light*
- **Arkansas State University,** Jonesboro, AR
  Bachelors of Science, Physics, May 2015
- **Arkansas State University,** Jonesboro, AR
  Bachelors of Science, Mathematics, May 2012
  Minor in Statistics, May 2012

Experience

- **Instructor of Electrical Engineering,** (August 2018 - present)
  Arkansas State University, College of Engineering
  Responsibilities:
  - Demonstrate theoretical and programming methodologies
  - Develop detailed written and oral documents and presentations for instructional purposes
  - Advise and assess students and student performance
- **Research Scientist,** (May 2015 – August 2018)
  Arkansas State University, College of Engineering
  Responsibilities:
  - Theoretically and numerically analyze electromagnetic wave models
  - Develop detailed written and oral documents and presentations demonstrating analyses
  - Assist team members in understanding theoretical and numerical concepts
- **Graduate Research Assistant,** (Jan 2013 – May 2015)
  Arkansas State University, College of Sciences and Mathematics
  Responsibilities**:**
  - Theoretical and numerical testing of electromagnetic wave models
  - Develop detailed written and oral documents demonstrating analyses
- **Undergraduate Research Assistant,** (July 2008 – Dec 2012)
  Arkansas State University, Arkansas Center for Laser Applications & Science
  Responsibilities:

- Collect and analyze spectral data from LIBS (Laser Induced Breakdown Spectroscopy) experiments
- Align laser and experiment optics
- Perform laser and experiment maintenance
- Track laboratory inventory

Skills

Software Skills

- Matlab
- Mathematica
- Latex
- C++
- Python
- Linux
- Microsoft Office (Word, Excel, Power Point)
- LabView
- AutoCAD
- Eagle

Laboratory Skills

- Data Analysis
- Statistical and numerical modeling
- Optics handling and alignment
- Laser timing and alignment
- CCD timing and data acquisition
- UV-visible spectroscopy

Courses Taught

- ENGR 1402 – Concepts of Engineering (Small Group)
- ENGR 1412 – Software Applications for Engineers
- ENGR 2401 – Applied Engineering Statistics
- ENGR 2421 – Electric Circuits 1 Lab
- EE 3331 – Digital Electronics 1 Lab
- EE 2322 – Electrical Workshop
- EE 3343 – Fields & Waves
- EE 3393 – Probability & Random Signals

Publications and Proceedings

Journal Publications

1. C. Jones, B. A. Kemp, and C. J. Sheppard "Enhanced radiation pressure reversal on free carriers in nanoparticles and polarization dependence in the Rayleigh regime," *Optical Engineering* 60(2), 027104 (2021).
2. Mitra, N., B. A. Kemp, T. Sarkar, and C. J. Sheppard. "Non-touching confinement of ternary particle systems by electrostatic surface forces." *Journal of Applied Physics* 126, no. 7, 075111 (2019).

3. B. A. Kemp and C. J. Sheppard, “Electromagnetic and material contributions to stress, energy, and momentum in metamaterials,” *Advanced Electromagnetics* 6, 11-19 (2017).
4. C. J. Sheppard and B. A. Kemp, “Relativistic analysis of field-kinetic and canonical electromagnetic systems,” *Physical Review A* 93, 053832 (2016).
5. B. A. Kemp, I. Nikolayev, and C. J. Sheppard, “Coupled electrostatic and material surface stresses yield anomalous particle interactions and deformation,” *Journal of Applied Physics.* 119, 145105 (2016).
6. C. J. Sheppard and B. A. Kemp, “Kinetic energy-momentum tensor in electrodynamics,” *Physical Review A*, 93, 013855 (2016).
7. C. J. Sheppard and B. A. Kemp, “Optical pressure deduced from energy relations within relativistic formulations of electrodynamics,” *Physical Review A* 89, 013825 (2014).

International Conference Presentations (Presenter in Bold)

1. **B. A. Kemp** and C. J. Sheppard, “Electromagnetic and material contributions to stress, energy, and momentum in metamaterials,” *Advanced Electromagnetics Symposium,* Malaga, Spain (July 2016).
2. **B. A. Kemp** and C. J. Sheppard, “Field and Material Stresses Predict Observable Surface Forces in Optical and Electrostatic Manipulation,” *SPIE Optical Trapping and Optical Micromanipulation XIII,* Invited Presentation, San Diego, CA (August 2016).
3. **C. J. Sheppard** and B. A. Kemp, “A Relativistic Treatment of the Kinetic and Canonical Electromagnetic Systems,” *Progress in Electromagnetics Research Symposium,* Invited Presentation, Shanghai, China (August 2016).
4. **B. A. Kemp** and C. J. Sheppard, “Physics of electromagnetic and material stresses in optical manipulation,” *SPIE Optical Trapping and Optical Micromanipulation XII,* Invited Presentation, San Diego, CA (August 2015).

Publications in Reviewed Proceedings

1. B. A. Kemp and C. J. Sheppard "Modeling optical manipulation using the field-kinetic and canonical formulations of electrodynamics", Proc. SPIE 11083, Optical Trapping and Optical Micromanipulation XVI, 110832A (2019)
2. B. A. Kemp and C. J. Sheppard, “Field and Material Stresses Predict Observable Surface Forces in Optical and Electrostatic Manipulation,” Proc. *SPIE* 9922, 99220T (2016).
3. B. A. Kemp and C. J. Sheppard, “Electromagnetic and material contributions to stress, energy, and momentum in metamaterials,” Proceedings of the 4th Annual Advanced Electromagnetics Symposium, 214 (2016). ISSN 2491-2417.
4. B. A. Kemp and C. J. Sheppard, “Physics of electromagnetic and material stresses in optical manipulation,” Proc. *SPIE* 9548, 95480L (2015).
5. J. Merten, M. Jones, C. J. Sheppard, C. Parigger, S. D. Allen, “Spatiotemporal evolution of plasma molecular emission following laser ablation of explosive analogs", Proc. *SPIE* 8710, 87100S (2013)

Regional Conference Papers and Presentations (Presenter in Bold)

1. **C. J. Sheppard** and B. A. Kemp, "A Relativistic Approach to Kinetic and Canonical Electromagnetic Systems," Presented (oral) by Sheppard April 1, 2016 at the 100th Meeting of the Arkansas Academy of Science, Fayetteville, AR.
2. **C. J. Sheppard** and B. A. Kemp, "The kinetic of subsystem of light: A Lagrangian approach," Presented by Sheppard April 2015 at the fifth annual Create @STATE: A Symposium of Research, Scholarship & Creativity, Jonesboro, AR.
3. **C. J. Sheppard** and B. A. Kemp, "Balazs' Thought Experiment Revisited: The Relativistic Electromagnetic Approach," Presented by Sheppard April 2015 at the fifth annual Create @STATE: A Symposium of Research, Scholarship & Creativity, Jonesboro, AR.
4. **C. J. Sheppard** and B. A. Kemp, "Optical Energy and Pressure from Relativistic Electrodynamics," Presented by Sheppard April 2014 at the fourth annual Create @ STATE: A Symposium of Research, Scholarship & Creativity, Jonesboro, AR. This presentation won Best Overall Presentation in Chemistry and Physics.
5. **C. J. Sheppard** and B. A. Kemp, "Optical Pressure and Energy Relations of Relativistic Electrodynamics," Presented by Sheppard March 7, 2014 at Arkansas Posters at the Capitol, Little Rock, AR.

Honors Societies

- Phi Kappa Phi (Member since March 2015)
- Society of Physics Students (President, Arkansas State University Chapter, Aug 2013 – May 2015)