

Jason C. Heikenfeld Professor of Electrical Engineering, Materials Science and Engineering, Biomedical Engineering. Assistant Vice President for Entrepreneurial Affairs and Technology Commercialization.

Senior Member IEEE, Senior Member Society for Information Display, Life Member SPIE, Member ASEE, Member Sigma Xi, Fellow National Academy of Inventors.

Work Address

University of Cincinnati
824 Rhodes Hall
Cincinnati, OH 45221-0030

Contact

heikenjc@ucmail.uc.edu
513-556-4763
www.ece.uc.edu/devices

Google Scholar

For an automatically updated listing of scholarly work:
<http://scholar.google.com/citations?user=XT0IBpMAAAAJ>

Expertise

Device scientist/architect with particular strengths in rapid prototyping, electronic materials, microfluidics, electrofluidics, biosensors, electronic displays, flexible electronics, and optics. Our goals are not incremental or participatory, but rather, to introduce technologies that are disruptive.

Personal Statement

I value my career by how much I can: make a real difference for students; advance the reputation of my university; contribute to vibrancy of my surrounding community. It is a privilege to be faculty at the Univ. of Cincinnati, a setting where I can pursue all of these aspirations to their fullest extent.

Education

- 2001 **Ph.D., Electrical Engineering.**
University of Cincinnati, Cincinnati, Ohio.
Thesis: *Rare earth-doped GaN flat panel display devices.*
Advisor: Prof. Andrew J. Steckl, Fellow IEEE.
- 1998 **B.S., Electrical Engineering.**
University of Cincinnati, Cincinnati, Ohio.
Minors: Photonics, Physics.

Major Professional Experience

- 2017-Pres. **University of Cincinnati**
Assistant Vice President for Entrepreneurial Affairs and Technology Commercialization
- 2005-Pres. **University of Cincinnati:** 2005 – Asst. Prof / 2009 – Assoc. Prof. / 2013 – Full Prof.
Dept. of Electrical Engineering and Computing Systems, Director – Novel Devices Laboratory
- 2015-Pres. **Eccrine Systems Corp.,**
Chief Scientific Officer.
- 2013-2015 **Chief Technology Officer, Lead Founder.**
- 2009-2014 **Gamma Dynamics,**
Principal Scientist, Lead Founder → up to 8 full-time employees. Winner - 2013 Frost & Sullivan Global Technology Innovation Leadership Award.
- 2010-2012 **Ohio Center for Microfluidic Innovation**
Founder, Director 2010-2012 → \$5.9M grant to build the center.
- 2001-2005 **Extreme Photonix,**
Principal Scientist, Co-founder
- 1996-1997 **3M Precision Optics Inc.,**

1995 **Hal Computer Systems Inc.,**
VLSI Design Engineer

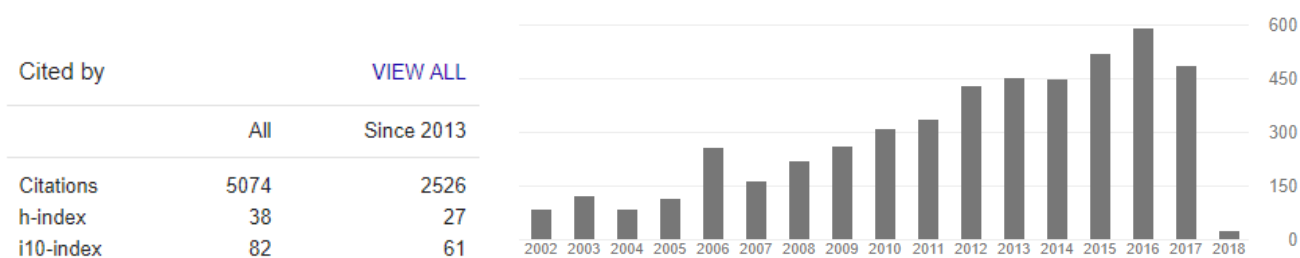
■ Major Honors/Awards/Achievements

- 2018 - Ohio Faculty Council Technology Commercialization Award (1 faculty award, statewide)
- 2017 - Selected for Univ. Bordeaux Visiting Scholars Program (summer 2017)
 - Eccrine Systems Inc. named by Bloomberg as one of top 50 startups worldwide (metrics driven)
 - Frost & Sullivan North American Technology Innovation Award (Eccrine Systems)
- 2016 - Earned the recognition as one of UC's top 3 Educators (all disciplines and campuses), and #1 in STEM, based on average of all online ratings tabulated by the UC News Record.
- 2015 - Ernst and Young Edge Award (Ohio Valley region: south-central Ohio / Illinois / Kentucky)
 - Elected to the rank of Fellow: Univ. Cincinnati Graduate School
- 2014 - Elected to the rank of Fellow: National Academy of Inventors
 - Elected to the rank of Fellow: Univ. Cincinnati Academy for Teaching and Learning
- 2013 - Sigma Xi Young Investigator Award (university – UC)
 - Established Entrepreneur Award (university – UC)
 - Master Educator (college – CEAS)
 - Top 25 STEM Scholars in Ohio (all Ohio universities)
 - Frost & Sullivan Global Technology Innovation Leadership Award (Gamma Dynamics)
- 2012 - Distinguished Engineering Researcher (college - CEAS)
 - Eta Kappa Nu Outstanding Professor Award (school - SECS)
 - William H. Middendorf Research Excellence Award (school - SECS)
- 2010 - University of Cincinnati Emerging Entrepreneur Award (university - UC)
- 2009 - Cincinnati Innovates, Taft Stettinius & Hollister Patent Award – 1st Place (273 entrants)
- 2009 - COE Research Award for Young Faculty (college - CEAS)
 - Eta-Kappa-Nu Professor of the Year (school - SECS)
- 2008 - Neil Wandmacher Teaching Award for Young Faculty (college - CEAS)
- 2007 - NSF CAREER Award.
- 2007 - 1st Ever Recipient of All Three School Awards in the Same Year (>40 faculty)
 - William E. Restemeyer Teaching Excellence Award
 - William H. Middendorf Research Excellence Award
 - Eta-Kappa-Nu Professor of the Year
- 2006 - AFOSR Young Investigator Award (one of only 21 awarded nationally across all sciences).
- 2005 - Developed technology and prototype in R&D Magazine Top 100 Award with IST Inc.
- 2001 - Direct Ph.D. in 2 yrs. 10 mo., with 12 journal articles, 10 presentations, and multiple patents.

■ Publications

all are in IEEE bibliographic format

Google Scholar Statistics (as of January 2018)



Books

1. F. Mugele and J. Heikenfeld – “Electrowetting” – *in preparation*.

Book Chapters

2. J. Heikenfeld, "Section 8- Paper-Like and Low Power Displays," in Handbook of Visual Display Technology. ed. Editorial Board, Canopus Academic Publishing, 2011.
3. J. Heikenfeld and M. Dhindsa, "Electrowetting on Superhydrophobic Surfaces: Present Status and Prospects," in Superhydrophobic Surfaces. ed. A. Carre and K. L. Mittal, 2008, ISBN 9789004165939.
4. P. D. Rack, J. Heikenfeld, and A. J. Steckl, "Inorganic electroluminescent displays," in Handbook of Luminescence and Display Materials and Devices. ed. B. R. Vaddi and H. S. Nalwa, Amer. Sci. Publishers, 2002.

Articles/ Proceedings (updated through end of 2017)

5. S. A. Ventura et al., “Cortisol extraction through human skin by reverse iontophoresis,” *Bioelectrochemistry*, vol. 114, pp. 54–60, Apr. 2017.
6. C. B. Eaker, I. D. Joshipura, L. R. Maxwell, J. Heikenfeld, and M. D. Dickey, “Electrowetting without external voltage using paint-on electrodes,” *Lab Chip*, vol. 17, no. 6, pp. 1069–1075, 2017.
7. A. V Diebold et al., “Electrowetting-actuated liquid metal for RF applications,” *J. Micromechanics Microengineering*, vol. 27, no. 2, p. aa556a, 2017.
8. Z. Sonner, E. Wilder, T. Gaillard, G. Kasting, and J. Heikenfeld, “Integrated sudomotor axon reflex sweat stimulation for continuous sweat analyte analysis with individuals at rest,” *Lab Chip*, vol. 17, no. 15, pp. 2550–2560, 2017.
9. P. Simmers, S. K. Li, G. Kasting, and J. Heikenfeld, “Prolonged and localized sweat stimulation by iontophoretic delivery of the slowly-metabolized cholinergic agent carbachol,” *J. Dermatol. Sci.*, 2017.
10. A. Hauke et al., “Superwetting and aptamer functionalized shrink-induced high surface area electrochemical sensors,” *Biosens. Bioelectron.*, vol. 94, no. March, pp. 438–442, 2017.
11. J. Heikenfeld et al., “Wearable sensors: modalities, challenges, and prospects,” *Lab Chip*, vol. 18, no. 2, 2017.
12. R. Peng et al., “A new oil/membrane approach for integrated sweat sampling and sensing: sample volumes reduced from μL 's to nL 's and reduction of analyte contamination from skin,” *Lab Chip*, vol. 16, no. 22, pp. 4415–4423, 2016.
13. P. Schultz and J. Heikenfeld, “Enhanced optical discrimination system based on switchable retroreflective films,” *Opt. Eng.*, vol. 55, no. 4, p. 45101, Mar. 2016.
14. L. S. S. Kumar, X. Wang, J. Hagen, R. Naik, I. Papautsky, and J. Heikenfeld, “Label free nano-aptasensor for interleukin-6 in protein-dilute bio fluids such as sweat,” *Anal. Methods*, vol. 8, no. 17, pp. 3440–3444, 2016.
15. J. Heikenfeld, “Non-invasive Analyte Access and Sensing through Eccrine Sweat: Challenges and Outlook circa 2016,” *Electroanalysis*, vol. 28, no. 6, pp. 1242–1249, Jun. 2016.
16. S. Holcomb et al., “Oxide-Free Actuation of Gallium Liquid Metal Alloys Enabled by Novel Acidified Siloxane Oils,” *Langmuir*, vol. 32, no. 48, pp. 12656–12663, Dec. 2016.
17. J. Heikenfeld, “Technological leap for sweat sensing,” *Nature*, vol. 529, no. 7587, pp. 475–476, Jan. 2016.
18. D. P. Rose et al., “Adhesive RFID Sensor Patch for Monitoring of Sweat Electrolytes,” *IEEE Trans. Biomed. Eng.*, vol. 62, no. 6, pp. 1457–1465, Jun. 2015.
19. S. Mukherjee, W. L. Hsieh, N. Smith, M. Goulding, and J. Heikenfeld, “Electrokinetic pixels with biprimary inks for color displays and color-temperature-tunable smart windows,” *Appl. Opt.*, vol. 54, no. 17, p. 5603, Jun. 2015.

20. A. C. Russell, W. L. Hsieh, K. C. Chen, and J. Heikenfeld, "Experimental and Numerical Insights into Isotropic Spreading and Deterministic Dewetting of Dielectrowetted Films," *Langmuir*, vol. 31, no. 1, pp. 637–642, Jan. 2015.
21. B. L. Cumby, D. B. Mast, C. E. Tabor, M. D. Dickey, and J. Heikenfeld, "Robust Pressure-Actuated Liquid Metal Devices Showing Reconfigurable Electromagnetic Effects at GHz Frequencies," *IEEE Trans. Microw. Theory Tech.*, vol. 63, no. 10, pp. 3122–3130, Oct. 2015.
22. K. D. B. Dijkstra, J. Kipping, and N. Mézière, "Sixty new dragonfly and damselfly species from Africa (Odonata)," in *Odonatologica*, vol. 44, no. 4, Intergovernmental Panel on Climate Change, Ed. Cambridge: Cambridge University Press, 2015, pp. 447–678.
23. W.-L. Hsieh, K.-C. Chen, and J. Heikenfeld, "Sophisticated oil film geometries through incomplete electrical dewetting by feedback control and Fourier construction," *Lab Chip*, vol. 15, no. 12, pp. 2615–2624, 2015.
24. Z. Sonner et al., "The microfluidics of the eccrine sweat gland, including biomarker partitioning, transport, and biosensing implications," *Biomicrofluidics*, vol. 9, no. 3, p. 31301, May 2015.
25. S. Mukherjee et al., "59.4L: Late-News Paper : The Biprimary Color System for E-Paper: Doubling Color Performance Compared to RGBW," *SID Symp. Dig. Tech. Pap.*, vol. 45, no. 1, pp. 869–872, Jun. 2014.
26. S. Mukherjee et al., "A first demonstration and analysis of the biprimary color system for reflective displays," *J. Soc. Inf. Disp.*, vol. 22, no. 2, pp. 106–114, Feb. 2014.
27. A. Schultz, I. Papautsky, and J. Heikenfeld, "Investigation of Laplace Barriers for Arrayed Electrowetting Lab-on-a-Chip," *Langmuir*, vol. 30, no. 18, pp. 5349–5356, May 2014.
28. J. Heikenfeld, "Let them see you sweat," *IEEE Spectr.*, vol. 51, no. 11, pp. 46–63, Nov. 2014.
29. A. Russell, E. Kreit, and J. Heikenfeld, "Scaling Dielectrowetting Optical Shutters to Higher Resolution: Microfluidic and Optical Implications," *Langmuir*, vol. 30, no. 18, pp. 5357–5362, May 2014.
30. D. P. Rose et al., "System-level design of an RFID sweat electrolyte sensor patch," in 2014 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2014, pp. 4038–4041.
31. M. Hagedon, J. Heikenfeld, K. A. Dean, E. Kreit, K. Zhou, and J. Rudolph, "112.1: Invited Paper : Electrofluidic Imaging Films for Brighter, Faster, and Lower-Cost e-Paper," *SID Symp. Dig. Tech. Pap.*, vol. 44, no. 1, pp. 111–114, Jun. 2013.
32. M. Hagedon and J. Heikenfeld, "A hybrid of microreplication and mask-less photolithography for creating dual porosity and textured surface membranes," *J. Micromechanics Microengineering*, vol. 23, no. 11, p. 117005, Nov. 2013.
33. L. Hou et al., "Artificial microfluidic skin for in vitro perspiration simulation and testing," *Lab Chip*, vol. 13, no. 10, p. 1868, 2013.
34. S. P. Atwood and B. W. Award, "contents," vol. 29, no. 2, 2013.
35. A. Schultz, S. Chevalliot, S. Kuiper, and J. Heikenfeld, "Detailed analysis of defect reduction in electrowetting dielectrics through a two-layer 'barrier' approach," *Thin Solid Films*, vol. 534, pp. 348–355, May 2013.
36. R. Zhao, X. Hua, Z. Liang, and J. Heikenfeld, "Dielectrowetting-based manipulation of droplet and application in light valve," 2013, p. 90440F.
37. R. Zhao, B. Cumby, A. Russell, and J. Heikenfeld, "Large area and low power dielectrowetting optical shutter with local deterministic fluid film breakup," *Appl. Phys. Lett.*, vol. 103, no. 22, p. 223510, Nov. 2013.
38. "Back matter," *Lab Chip*, vol. 12, no. 24, p. 5279, 2012.
39. E. Kreit et al., "Biological versus electronic adaptive coloration: how can one inform the other?," *J. R. Soc. Interface*, vol. 10, no. 78, pp. 20120601–20120601, Nov. 2012.
40. A. J. Steckl, J. Heikenfeld, and S. Allen, "Hybrid Inorganic/Organic Light Emitting Materials and Devices for Displays and Lighting," in 12th Intl. Conf. Electrolum, pp. 329–332.
41. M. Hagedon, S. Yang, A. Russell, and J. Heikenfeld, "Bright e-Paper by transport of ink through a white electrofluidic imaging film," *Nat. Commun.*, vol. 3, p. 1173, Nov. 2012.
42. A. Banerjee, Y. Liu, J. Heikenfeld, and I. Papautsky, "Deterministic splitting of fluid volumes in electrowetting microfluidics," *Lab Chip*, vol. 12, no. 24, p. 5138, 2012.
43. J. C. Heikenfeld, "Display Week 2012 Review: e-Paper," *Inf. Disp. (1975)*, vol. 28, no. 7 & 8, pp. 6–9, 2012.
44. K. J. Rebello et al., "Electrofluidic systems for contrast management," 2012, p. 83731A.
45. S. Chevalliot, S. Kuiper, and J. Heikenfeld, "Experimental Validation of the Invariance of Electrowetting Contact Angle Saturation," *J. Adhes. Sci. Technol.*, vol. ahead-of-p, no. ahead-of-print, pp. 1–22, Jan. 2012.
46. P. Schultz, B. Cumby, and J. Heikenfeld, "Investigation of five types of switchable retroreflector films for enhanced visible and infrared conspicuity applications," *Appl. Opt.*, vol. 51, no. 17, p. 3744, Jun. 2012.
47. J. August, "Official Monthly Publication of the Society for Information Display • www.informationdisplay.org Editorial : Celebrating 50 Years and Counting," vol. 28, no. August, 2012.
48. B. L. Cumby, G. J. Hayes, M. D. Dickey, R. S. Justice, C. E. Tabor, and J. C. Heikenfeld, "Reconfigurable liquid metal circuits by Laplace pressure shaping," *Appl. Phys. Lett.*, vol. 101, no. 17, p. 174102, Oct. 2012.

49. A. Banerjee, E. Kreit, Y. Liu, J. Heikenfeld, and I. Papautsky, "Reconfigurable virtual electrowetting channels," *Lab Chip*, vol. 12, no. 4, pp. 758–764, 2012.
50. J. H. Noh, J. Noh, E. Kreit, J. Heikenfeld, and P. D. Rack, "Toward active-matrix lab-on-a-chip: programmable electrofluidic control enabled by arrayed oxide thin film transistors," *Lab Chip*, vol. 12, no. 2, pp. 353–360, 2012.
51. A. Schultz, J. Heikenfeld, H. S. Kang, and W. Cheng, "1000:1 Contrast Ratio Transmissive Electrowetting Displays," *J. Disp. Technol.*, vol. 7, no. 11, pp. 583–585, Nov. 2011.
52. J. Heikenfeld, "A new bi-primary color system for doubling the reflectance and colorfulness of e-paper," 2011, p. 795608.
53. A. Banerjee, E. Kreit, M. Dhindsa, J. Heikenfeld, and I. Papautsky, "A new electrowetting lab-on-a-chip platform based on programmable and virtual wall-less channels," 2011, p. 79290F.
54. S. Chevalliot, J. Heikenfeld, L. Clapp, A. Milarcik, and S. Vilner, "Analysis of Nonaqueous Electrowetting Fluids for Displays," *J. Disp. Technol.*, vol. 7, no. 12, pp. 649–656, Dec. 2011.
55. K. A. Dean et al., "and Display Technology Progress," pp. 111–113, 2011.
56. G. Walker, "Display week 2011 review: Touch technology," *Inf. Disp. (1975).*, vol. 27, no. 7–8, pp. 20–24, 2011.
57. S. Yang et al., "Electrofluidic displays: Fundamental platforms and unique performance attributes," *J. Soc. Inf. Disp.*, vol. 19, no. 9, p. 608, 2011.
58. S. Chevalliot and J. Heikenfeld, "Electrowetting optics and displays: Materials implications on performance and reliability," in 16th International Conference on Optical MEMS and Nanophotonics, 2011, pp. 45–46.
59. M. Dhindsa, J. Heikenfeld, W. Weekamp, and S. Kuiper, "Electrowetting without Electrolysis on Self-Healing Dielectrics," *Langmuir*, vol. 27, no. 9, pp. 5665–5670, May 2011.
60. S. Yang, M. Hagedon, and J. Heikenfeld, "Light Out-Coupling for Reflective Displays: Simple Geometrical Model, MATLAB Simulation, and Experimental Validation," *J. Disp. Technol.*, vol. 7, no. 9, pp. 473–477, Sep. 2011.
61. E. Kreit, B. M. Mognetti, J. M. Yeomans, and J. Heikenfeld, "Partial-post laplace barriers for virtual confinement, stable displacement, and $\approx 5 \text{ cm s}^{-1}$ electrowetting transport," *Lab Chip*, vol. 11, no. 24, p. 4221, 2011.
62. M. Dhindsa, S. Kuiper, and J. Heikenfeld, "Reliable and low-voltage electrowetting on thin parylene films," *Thin Solid Films*, vol. 519, no. 10, pp. 3346–3351, Mar. 2011.
63. J. Heikenfeld, P. Drzaic, J.-S. Yeo, and T. Koch, "Review Paper: A critical review of the present and future prospects for electronic paper," *J. Soc. Inf. Disp.*, vol. 19, no. 2, p. 129, 2011.
64. J. Heikenfeld, "Section 8- Paper-Like and Low Power Displays," in *Handbook of Visual Display Technology*, E. Board, Ed. Canopus Academic Publishing, 2011.
65. S. Chevalliot and J. Heikenfeld, "The Invariance of Electrowetting Contact Angle Saturation to Polymer, Fluid, and Interfacial Materials Properties," *MRS Proc.*, vol. 1346, p. mrs11-1346-aa04-03, Jan. 2011.
66. L. Hou and J. Heikenfeld, "Demonstration of a Scalable Microfabrication Process for Arrayed Electrowetting Microprisms," in 2010 18th Biennial University/Government/Industry Micro/Nano Symposium, 2010, pp. 1–1.
67. J. Heikenfeld, "Display Week 2011 Review: E-Paper," *Inf. Disp.*, vol. 27, no. 8.
68. S. Govindaswamy, J. Heikenfeld, R. Sridhara, and K. P. Roenker, "Effects of optical injection in GaInP-based heterojunction bipolar phototransistors," in *Proc. of the State-of-the-Art Program on Compound Semiconductors XXIX*, *Electrochem. Soc.*, vol. 98 – 12.
69. J. Heikenfeld, "Electrofluidic displays could broaden electronic paper uses," *SPIE Newsroom*.
70. J. Heikenfeld et al., "Electrofluidic Displays- First Prototypes, A New Bistable Architecture, and 'Perfect' Segmented Electronic Paper," in *Intl. Disp. Workshops*.
71. K. A. Dean et al., "Electrofluidic Displays: Multi-stability and Display Technology Progress," in *SID Symp. Dig.* 42, vol. 111.
72. J. Heikenfeld and A. J. Steckl, "Electroluminescent Devices on Glass Using a High Temperature Stable GaN-based Phosphor and Thick Film Dielectric," *Trans. Electron Devices*, vol. 49, no. 4, pp. 557–563.
73. J. Heikenfeld and A. J. Steckl, "Electroluminescent Displays at a Cross-Roads," *Inf. Disp.*, vol. 19, no. 12, pp. 20–25.
74. J. W. Haus, W. Ha, J. Heikenfeld, N. Smith, and P. McManamon, "Electrowetting Beam Steering using microprism array designs," in *SPIE Defense*.
75. W. Y. Cheng, K. L. Lo, and J. Heikenfeld, "Electrowetting displays, progression toward large area and high brightness flexible displays," in *IMID/IDMC/ASIA DISPLAY*.
76. K. Zhou, K. Dean, and J. Heikenfeld, "Flexible Electrofluidic Displays Using Brilliantly Colored Pigments," in *Proc. SID 2010*, p. 33.3.
77. J. Heikenfeld, B. Sun, K. Zhou, and K. Bhat, "Flexible Electrowetting Displays for e-Paper and Electrocamouflage," in *USDC Flexible Displays Conf.*

78. M. Hagedon and J. Heikenfeld, "Fluid Dosing of Pigment Dispersions in Electrofluidic Displays," in *IEEE Photonics*.
79. K. Zhou and J. Heikenfeld, "Handbook of Visual Display Technology," *Electrofluidic Displays*, vol. 8.1, no. 5.
80. J. Heikenfeld and A. J. Steckl, "High Contrast Thick Dielectric GaN Electroluminescent Displays on Glass Substrates," in *SID Intl. Symp. Digest*, vol. 33, pp. 96–99.
81. S. Allen, J. Heikenfeld, and A. J. Steckl, "Hybrid Inorganic/Organic Devices for Solid State White Lighting Applications," in *12th Intl. Conf. Electrolum*, pp. 53–55.
82. J. Heikenfeld, "E-paper: Clarifying future R&D needs by a fundamental understanding of the maximum performance of current technologies," in *2010 IEEE Photonic Society's 23rd Annual Meeting, 2010*, pp. 71–72.
83. M. Hagedon, K. Zhou, S. Yang, E. Kreit, and J. Heikenfeld, "Fluid dosing of pigment dispersions in electrofluidic displays," in *2010 IEEE Photonic Society's 23rd Annual Meeting, 2010*, pp. 252–253.
84. S. Yang, K. Zhou, E. Kreit, and J. Heikenfeld, "High reflectivity electrofluidic pixels with zero-power grayscale operation," *Appl. Phys. Lett.*, vol. 97, no. 14, p. 143501, Oct. 2010.
85. E. Kreit et al., "Laplace barriers for electrowetting thresholding and virtual fluid confinement," *Langmuir*, vol. 26, no. 23, pp. 18550–18556, 2010.
86. J. Heikenfeld, "Lite, brite displays," *IEEE Spectr.*, vol. 47, no. 3, pp. 28–56, Mar. 2010.
87. S. Yang, E. Kreit, J. Heikenfeld, and K. Zhou, "New Demonstration of Bistable Electrofluidic Display Pixels," in *2010 18th Biennial University/Government/Industry Micro/Nano Symposium, 2010*, pp. 1–1.
88. J. Yang, I. Papautsky, S. Kwon, P. D. Rack, M. Dhindsa, and J. Heikenfeld, "Programmable Electrowetting Channels," in *2010 18th Biennial University/Government/Industry Micro/Nano Symposium, 2010*, pp. 1–1.
89. W. Han, J. W. Haus, P. McManamon, J. Heikenfeld, N. Smith, and J. Yang, "Transmissive beam steering through electrowetting micropillar arrays," *Opt. Commun.*, vol. 283, no. 6, pp. 1174–1181, Mar. 2010.
90. M. Dhindsa, J. Heikenfeld, S. Kwon, J. Park, P. D. Rack, and I. Papautsky, "Virtual electrowetting channels: electronic liquid transport with continuous channel functionality," *Lab Chip*, vol. 10, no. 7, p. 832, 2010.
91. K. Zhou, J. Heikenfeld, K. A. Dean, E. M. Howard, and M. R. Johnson, "A full description of a simple and scalable fabrication process for electrowetting displays," *J. Micromechanics Microengineering*, vol. 19, no. 6, p. 65029, Jun. 2009.
92. P. F. McManamon et al., "A Review of Phased Array Steering for Narrow-Band Electrooptical Systems," *Proc. IEEE*, vol. 97, no. 6, pp. 1078–1096, Jun. 2009.
93. Jungwon Park et al., "Active-Matrix Microelectrode Arrays Integrated With Vertically Aligned Carbon Nanofibers," *IEEE Electron Device Lett.*, vol. 30, no. 3, pp. 254–257, Mar. 2009.
94. M. K. Kilaru, J. Yang, and J. Heikenfeld, "Advanced characterization of electrowetting retroreflectors," *Opt. Express*, vol. 17, no. 20, p. 17563, Sep. 2009.
95. W. Han, J. W. Haus, P. McManamon, J. Heikenfeld, N. R. Smith, and J. Yang, "Beam steering performance of electrowetting micropillar arrays," 2009, p. 73390J.
96. J. Heikenfeld et al., "Electrofluidic displays using Young–Laplace transposition of brilliant pigment dispersions," *Nat. Photonics*, vol. 3, no. 5, pp. 292–296, May 2009.
97. M. K. Kilaru, B. Cumby, and J. Heikenfeld, "Electrowetting retroreflectors: Scalable and wide-spectrum modulation between corner cube and scattering reflection," *Appl. Phys. Lett.*, vol. 94, no. 4, p. 41108, Jan. 2009.
98. N. R. Smith, Linlin Hou, Jinlin Zhang, and J. Heikenfeld, "Fabrication and Demonstration of Electrowetting Liquid Lens Arrays," *J. Disp. Technol.*, vol. 5, no. 11, pp. 411–413, Nov. 2009.
99. B. Raj, M. Dhindsa, N. R. Smith, R. Laughlin, and J. Heikenfeld, "Ion and Liquid Dependent Dielectric Failure in Electrowetting Systems," *Langmuir*, vol. 25, no. 20, pp. 12387–12392, Oct. 2009.
100. J. Zhang et al., "Preparation and Analysis of 1-Chloronaphthalene for Highly Refractive Electrowetting Optics," *Langmuir*, vol. 25, no. 17, pp. 10413–10416, Sep. 2009.
101. J. Heikenfeld et al., "Recent Progress in Arrayed Electrowetting Optics," *Opt. Photonics News*, vol. 20, no. 1, p. 20, Jan. 2009.
102. M. K. Kilaru and J. Heikenfeld, "A new type of information display device: Switchable electrowetting retroreflectors," in *LEOS 2008 - 21st Annual Meeting of the IEEE Lasers and Electro-Optics Society, 2008*, pp. 196–197.
103. J. Heikenfeld, N. Smith, L. Hou, and J. Zhang, "A novel electrowetting approach for optical phased arrays invited talk - EOSS," in *LEOS 2008 - 21st Annual Meeting of the IEEE Lasers and Electro-Optics Society, 2008*, pp. 577–578.
104. K. Zhou and J. Heikenfeld, "Arrayed electrowetting microwells," *Appl. Phys. Lett.*, vol. 92, no. 11, p. 113515, Mar. 2008.
105. B. Raj, N. R. Smith, L. Christy, M. Dhindsa, and J. Heikenfeld, "Composite Dielectrics and Surfactants for Low Voltage Electrowetting Devices," in *2008 17th Biennial University/Government/Industry Micro/Nano Symposium, 2008*, pp. 187–190.

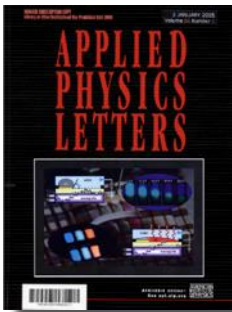
106. E. Kreit et al., "Recent Developments in Electrowetting Displays and Research of a New and Improved 'Electrofluidic' Display Platform," in IDMC/3DSA/ASIA DISPLAY.
107. K. Zhou, K. Dean, E. Kreit, S. Yang, and J. Heikenfeld, "Reliable Electrofluidic Display Pixels without Liquid Splitting," in Proc. SID, p. 111.
108. B. Sun, K. Zhou, Y. Lao, W. Cheng, and J. Heikenfeld, "Scalable Fabrication of Electrowetting Pixel Arrays with Self-Assembled Oil Dosing," Appl. Phys. Lett., vol. 91, p. 11106.
109. A. Harfmann and J. Heikenfeld, "Smart Light – Enhancing Fenestration to Improve Solar Distribution in Buildings."
110. J. Heikenfeld, N. R. Smith, L. Hou, and J. Zhang, "A Novel Electrowetting Approach for Optical Phased Arrays," in IEEE LEOS 2008.
111. N. R. Smith, L. Hou, J. Zhang, and J. Heikenfeld, "Switching Speed of Electrowetting Optics," in IEEE UGIM 2008.
112. S. Kwon et al., "The fabrication and characterization of electrically addressable microfluidic electrowetting channels," in EPIBN 09.
113. M. Hagedon, S. Yang, E. Kreit, and J. Heikenfeld, "The Present Status of e-Paper and Unique Competitive Strengths for Electrofluidic Displays," in Int. Disp. Manuf. Conf.
114. M. Dhindsa, J. Heikenfeld, S. Kwon, J. Park, and P. D. Rack, "Electrical Control of Debye Screening in Liquid Microchannels for Ionic Separations," in 2008 17th Biennial University/Government/Industry Micro/Nano Symposium, 2008, pp. 161–164.
115. J. Heikenfeld and M. Dhindsa, "Electrowetting on Superhydrophobic Surfaces: Present Status and Prospects," J. Adhes. Sci. Technol., vol. 22, no. 3–4, pp. 319–334, Jan. 2008.
116. J. Heikenfeld, S. Allen, and A. J. Steckl, "A Novel Fluorescent Display Using Lightwave Coupling Technology," in SID 2004 Digest, pp. 470–473.
117. J. Heikenfeld and A. J. Steckl, "Liquid Light-Electrowetting Emerging for Displays," Inf. Disp., vol. 20, no. 11, pp. 26–31.
118. J. Heikenfeld and A. J. Steckl, "Low Cost Display Technology Utilizing Thick Dielectric Electroluminescent Devices on Glass Substrates," in Proc. SID Symp. Vehicle Displays, pp. 12–15.
119. B. Raj, N. Smith, L. Christy, and J. Heikenfeld, "Low Voltage Electrowetting on Composite Dielectric Layers," in IEEE UGIM 2008.
120. N. R. Smith, L. Hou, J. Zhang, and J. Heikenfeld, "Experimental Validation of >1 kHz Electrowetting Modulation," in 2008 17th Biennial University/Government/Industry Micro/Nano Symposium, 2008, pp. 11–14.
121. J. C. Heikenfeld et al., "Flat electrowetting optics and displays," 2008, p. 688705.
122. B. Sun and J. Heikenfeld, "Observation and optical implications of oil dewetting patterns in electrowetting displays," J. Micromechanics Microengineering, vol. 18, no. 2, p. 25027, Feb. 2008.
123. J. Zhang, L. Hou, N. R. Smith, L. Christy, and J. C. Heikenfeld, "Toward the potential of electrowetting microprisms: High performance liquids, low voltage dielectrics, and 3D lithography," in LEOS 2008 - 21st Annual Meeting of the IEEE Lasers and Electro-Optics Society, 2008, pp. 261–262.
124. Y. Lao, B. Sun, K. Zhou, and J. Heikenfeld, "Ultra-High Transmission Electrowetting Displays Enabled by Integrated Reflectors," J. Disp. Technol., vol. 4, no. 2, pp. 120–122, Jun. 2008.
125. W. X. Li, J. Hagen, R. Jones, J. Heikenfeld, and A. J. Steckl, "Color tunable organic light emitting diodes using Eu complex doping," Solid. State. Electron., vol. 51, no. 3, pp. 500–504, Mar. 2007.
126. K. Zhou, B. Sun, Y. Lao, and J. Heikenfeld, "Electrowetting Light Valves for Electronic Paper," in LEOS 2007 - IEEE Lasers and Electro-Optics Society Annual Meeting Conference Proceedings, 2007, pp. 288–289.
127. L. Hou, N. R. Smith, and J. Heikenfeld, "Electrowetting manipulation of any optical film," Appl. Phys. Lett., vol. 90, no. 25, p. 251114, Jun. 2007.
128. L. Hou, N. R. Smith, and J. Heikenfeld, "Electrowetting Micro-prisms and Micro-mirrors," in LEOS 2007 - IEEE Lasers and Electro-Optics Society Annual Meeting Conference Proceedings, 2007, pp. 457–458.
129. J. Heikenfeld, "Flat Electrowetting Optics Based on Arrayed Light Valves and Microprisms," in LEOS 2007 - IEEE Lasers and Electro-Optics Society Annual Meeting Conference Proceedings, 2007, pp. 206–207.
130. K. Bhat, J. Heikenfeld, M. Agarwal, Y. Lvov, and K. Varahramyan, "Nonwoven electrowetting textiles," Appl. Phys. Lett., vol. 91, no. 2, p. 24103, Jul. 2007.
131. K. Bhat, J. Heikenfeld, M. Agarwal, Y. Lvov, and K. Varahramyan, "Non-Woven Electrowetting Textiles," Appl. Phys. Lett., vol. 91, no. 2, p. 24103, 2007.
132. B. Sun, K. Zhou, Y. Lao, J. Heikenfeld, and W. Cheng, "Scalable fabrication of electrowetting displays with self-assembled oil dosing," Appl. Phys. Lett., vol. 91, no. 1, p. 11106, Jul. 2007.
133. M. K. Kilaru, J. Heikenfeld, G. Lin, and J. E. Mark, "Strong charge trapping and bistable electrowetting on nanocomposite fluoropolymer:BaTiO₃ dielectrics," Appl. Phys. Lett., vol. 90, no. 21, p. 212906, May 2007.

134. N. Smith, D. Abeysinghe, J. Haus, and J. Heikenfeld, "A New Form of Flat Optics Enabled by Electrowetting Microprisms," in 2006 IEEE LEOS Annual Meeting Conference Proceedings, 2006, pp. 819–820.
135. N. R. Smith, D. C. Abeysinghe, J. W. Haus, and J. Heikenfeld, "Agile wide-angle beam steering with electrowetting microprisms," *Opt. Express*, vol. 14, no. 14, p. 6557, 2006.
136. M. S. Dhindsa et al., "Electrowetting on Arrayed Carbon Nanofibers," in 2006 Sixth IEEE Conference on Nanotechnology, 2006, pp. 207–210.
137. M. K. Kilaru, G. Lin, J. E. Mark, and J. C. Heikenfeld, "Hydrophobic Dielectrics of Fluoropolymer / BaTiO₃ Nanocomposites for Low-Voltage and Charge Storing Electrowetting Devices," *MRS Proc.*, vol. 949, pp. 949-C05-6, Jan. 2006.
138. W. Li, R. A. Jones, S. C. Allen, J. C. Heikenfeld, and A. J. Steckl, "Maximizing Alq₃ OLED internal and external efficiencies: charge balanced device structure and color conversion outcoupling lenses," *J. Disp. Technol.*, vol. 2, no. 2, pp. 1–10, 2006.
139. W. X. Li, R. A. Jones, S. C. Allen, J. C. Heikenfeld, and A. J. Steckl, "Maximizing Alq₃ OLED Internal and External Efficiencies: Charge Balanced Device Structure and Color Conversion Outcoupling Lenses," *J. Disp. Technol.*, vol. 2, no. 2, pp. 143–152, Jun. 2006.
140. M. S. Dhindsa et al., "Reversible Electrowetting of Vertically Aligned Superhydrophobic Carbon Nanofibers," *Langmuir*, vol. 22, no. 21, pp. 9030–9034, Oct. 2006.
141. C. Munasinghe et al., "High Brightness ZnS and GaN Electroluminescent Devices Using PZT Thick Dielectric Layers," *IEEE Trans. Electron Devices*, vol. 52, no. 2, pp. 194–203, Feb. 2005.
142. J. Heikenfeld and A. J. Steckl, "High-transmission electrowetting light valves," *Appl. Phys. Lett.*, vol. 86, no. 15, p. 151121, Apr. 2005.
143. J. Heikenfeld and A. J. Steckl, "Intense switchable fluorescence in light wave coupled electrowetting devices," *Appl. Phys. Lett.*, vol. 86, no. 1, p. 11105, Jan. 2005.
144. A. J. Steckl, J. Heikenfeld, and S. C. Allen, "Light Wave Coupled Flat Panel Displays and Solid-State Lighting Using Hybrid Inorganic/Organic Materials," *J. Disp. Technol.*, vol. 1, no. 1, pp. 157–166, Sep. 2005.
145. J. Heikenfeld and A. J. Steckl, "P-117: Electrowetting-Based Pixelation for Light Wave Coupling Displays," *SID Symp. Dig. Tech. Pap.*, vol. 36, no. 1, p. 746, 2005.
146. J. Heikenfeld and A. J. Steckl, "Electrowetting Light Valves with Loss-Less Transmission, Unlimited View Angle, and Video Response," in *SID 2005 Digest*, pp. 1674–1677.
147. L. Hou, N. Smith, and J. Heikenfeld, "Electrowetting Modulation of Any Flat Optical Film," *Appl. Phys. Lett.*, vol. 90, p. 251114.
148. J. Heikenfeld, "Electrowetting Optics- Fundamentals, Applications, and Opportunities/Needs for New Materials," in *Amer. Chemical Soc. 234th Natl. Mtg. & Exposition*.
149. J. Heikenfeld, "Electrowetting optics on target for record optical performance," *SPIE Newsroom*, p. 19862.
150. A. J. Steckl and J. Heikenfeld, "Emissive Electrowetting Devices for Hybrid I/O TM Displays," in *IEEE LEOS 2004*, pp. 250–251.
151. J. Heikenfeld and A. J. Steckl, "Fabrication and performance characteristics of black-dielectric electroluminescent 160x80 displays," *J. Soc. Inf. Disp.*, vol. 12, no. 1, pp. 57–64.
152. J. Heikenfeld, N. Smith, D. Abeysinghe, A. J. Steckl, and J. W. Haus, "Flat Electrowetting Optics," *IEEE LEOS Newsl.*, vol. 20, no. 4, pp. 4–10.
153. J. Heikenfeld and A. J. Steckl, "Fabrication and performance characteristics of black-dielectric electroluminescent 160 x 80-pixel displays," *J. Soc. Inf. Disp.*, vol. 12, no. 1, p. 57, 2004.
154. J. C. Heikenfeld and A. J. Steckl, "Liquid light," *Appl. Phys. Lett.*, vol. 85, no. 7, pp. 1128–1130, 2004.
155. C. C. Baker, J. Heikenfeld, Z. Yu, and A. J. Steckl, "Optical amplification and electroluminescence at 1.54 μm in Er-doped zinc silicate germanate on silicon," *Appl. Phys. Lett.*, vol. 84, no. 9, pp. 1462–1464, Mar. 2004.
156. C. Munasinghe et al., "Improved luminance and efficiency of ZnS:Mn and GaN:Eu TDEL devices using PZT thick dielectric films," in 2003 International Semiconductor Device Research Symposium, ISDRS 2003 - Proceedings, 2003, pp. 75–76.
157. R. J. AJ Steckl, JC Heikenfeld, C Munasinghe, DS Lee, YQ Wang, "Inorganic electroluminescent displays: the impact of new materials," *J. Soc. Inf. Disp.*, vol. 19, no. 12, pp. 20–25, 2003.
158. U. Hömmerich, E. E. Nyein, D. Lee, J. Heikenfeld, A. Steckl, and J. Zavada, "Photoluminescence studies of rare earth (Er, Eu, Tm) in situ doped GaN," *Mater. Sci. Eng. B*, vol. 105, no. 1–3, pp. 91–96, Dec. 2003.
159. E. E. Nyein, U. Hömmerich, J. Heikenfeld, D. S. Lee, A. J. Steckl, and J. M. Zavada, "Spectral and time-resolved photoluminescence studies of Eu-doped GaN," *Appl. Phys. Lett.*, vol. 82, no. 11, pp. 1655–1657, Mar. 2003.

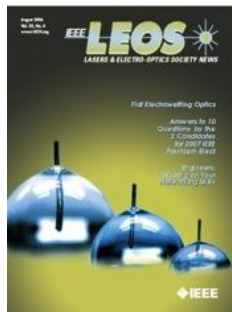
160. C. C. Baker, A. J. Steckl, J. C. Heikenfeld, E. E. Nyein, and U. Hommerich, "1.5 μ m Er-doped Zinc Silicate Germanate Waveguide Amplifier," in IEEE LEOS 2003.
161. J. Heikenfeld and A. J. Steckl, "AC operation of GaN: Er thin film electroluminescent display devices," in Proc. of Mat. Res. Soc. 2002, Symp. on GaN and Related Alloys.
162. J. Park et al., "Active-Matrix Microelectrode Arrays Integrated With Vertically Aligned Carbon Nanofibers," Electron Device Lett. IEEE, vol. 30, no. 3, pp. 254–257.
163. J. Heikenfeld and A. J. Steckl, "Black and Blue: The Impact of Pigmented Thick Dielectrics for Superior Contrast Inorganic EL Displays," in Proc. of the 10th Intl. Disp. Workshops.
164. J. Heikenfeld, R. A. Jones, and A. J. Steckl, "Black Dielectric Electroluminescent 160x80 Pixel Display," in 2003 SID Intl. Symp. Digest, pp. 1098–1101.
165. J. Heikenfeld and A. J. Steckl, "Demonstration of Fluorescent RGB Electrowetting Devices for Light Wave Coupling Displays," in 12th Intl. Conf. Electrolum, pp. 302–305.
166. K. A. Dean, M. R. Johnson, E. Howard, K. Zhou, and J. Heikenfeld, "Development of Flexible Electrowetting Displays for Stacked Color," in Proc. SID 09.
167. L. Hou, J. Zhang, N. Smith, J. Yang, and J. Heikenfeld, "A full description of a scalable microfabrication process for arrayed electrowetting microprisms," J. Micromech. Microeng., vol. 20, no. 1, p. 15044.
168. J. Heikenfeld et al., "A High-Brightness Electrofluidic Display Film," in Society for Inf. Display Intl. Symposium, vol. 8–1.
169. J. Heikenfeld and A. J. Steckl, "Contrast-enhancement in black dielectric electroluminescent devices," IEEE Trans. Electron Devices, vol. 49, no. 8, pp. 1348–1352, Aug. 2002.
170. J. Heikenfeld and A. J. Steckl, "Electroluminescent devices using a high-temperature stable GaN-based phosphor and thick-film dielectric layer," IEEE Trans. Electron Devices, vol. 49, no. 4, pp. 557–563, Apr. 2002.
171. D. S. Lee and A. J. Steckl, "Ga flux dependence of Er-doped GaN luminescent thin films," Appl. Phys. Lett., vol. 80, no. 5, pp. 728–730, Feb. 2002.
172. D. S. Lee, J. Heikenfeld, and A. J. Steckl, "Growth-temperature dependence of Er-doped GaN luminescent thin films," Appl. Phys. Lett., vol. 80, no. 3, pp. 344–346, 2002.
173. J. Heikenfeld, R. Jones, and A. J. Steckl, "Matrix Addressed Black Dielectric Electroluminescent Displays for Automotive Use," in Proc. SID Vehicular Display Symp.
174. [40] C. C. Baker, J. Heikenfeld, Z. Yu, and A. J. Steckl, "Optical Amplification and Electroluminescence at 1.54 μ m in Er-doped Zinc Silicate Germanate on Silicon," Appl. Phys. Lett., vol. 84, no. 9, pp. 1462–1464.
175. J. Heikenfeld and A. J. Steckl, "Performance Characteristics of Black Dielectric EL Displays for Broad Vehicular Usage," in Proc. SID Vehicular Display Symp.
176. J. Heikenfeld, "Performance Projections and Materials Issues for Transmissive and Reflective Electrowetting Displays," in Intl. Disp. Manuf. Conf.
177. U. Hommerich et al., "Photoluminescence Studies of Erbium- and Europium- doped Gallium Nitride prepared by Solid Source Molecular Beam Epitaxy," in Proc. Matl. Res. Soc. Mtg.
178. C. C. Baker, J. Heikenfeld, and A. J. Steckl, "Photoluminescent and Electroluminescent Zn₂Si_{0.5}Ge_{0.5}O₄:Mn Thin Films for Integrated Optic Devices," IEEE J. Sel. Top. Quant. Elect., vol. 8, no. 6, pp. 1420–1426.
179. S. Kwon, J. Noh, P. Rack, I. Papautsky, and J. Heikenfeld, "Quantitative Calculation of Oxygen Incorporation in Sputtered Indium Gallium Zinc Oxide (IGZO) Films and the Subsequent Impact on the Electron Transport and Thin Film Transistor Properties," in Proc. of Elect. Chemi. Soc., p. 1821.
180. R. Jones, J. Heikenfeld, and A. J. Steckl, "Rare Earth Doped GaN Black Dielectric Electroluminescent Technology for Full-Color, High-Contrast Display Applications," in Proc. SID Vehicular Display Symp.
181. A. J. Steckl, J. Heikenfeld, and D. S. Lee, "Rare-Earth-Doped GaN Phosphors for Electroluminescent Displays," in Intl. Conf. Sci. Tech. Emis. Disp., pp. 95–98.
182. A. J. Steckl, J. Heikenfeld, D. S. Lee, Y. Q. Wang, and R. Jones, "Rare-earth-doped GaN Phosphors: Growth, Properties, and Fabrication of Electroluminescent Devices," in Proc. Electroluminescence 2002.
183. P. D. Rack, J. Heikenfeld, and A. J. Steckl, "Inorganic electroluminescent displays," in Handbook of Luminescence and Display Materials and Devices, B. R. Vaddi and H. S. Nalwa, Eds. Amer. Sci. Publishers, 2002.
184. C. C. Baker, J. Heikenfeld, and A. J. Steckl, "Photoluminescent and electroluminescent Zn/sub 2/Si/sub 0.5/Ge/sub 0.5/O/sub 4/:Mn thin films for integrated optic devices," IEEE J. Sel. Top. Quantum Electron., vol. 8, no. 6, pp. 1420–1426, Nov. 2002.
185. J. Heikenfeld and A. J. Steckl, "Rare-earth-doped GaN switchable color electroluminescent devices," IEEE Trans. Electron Devices, vol. 49, no. 9, pp. 1545–1551, Sep. 2002.
186. A. J. Steckl et al., "Rare-earth-doped GaN: growth, properties, and fabrication of electroluminescent devices," IEEE J. Sel. Top. Quantum Electron., vol. 8, no. 4, pp. 749–766, Jul. 2002.

Featured on the Cover

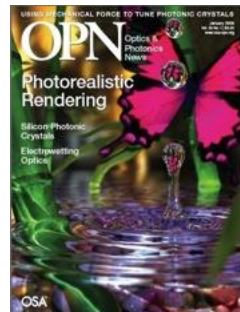
2005



2006



2007



2009



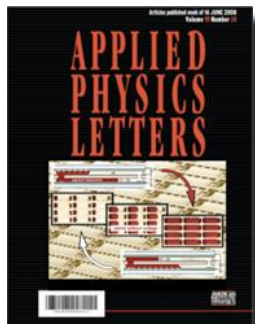
2010



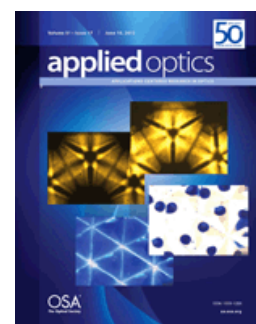
2010



2010



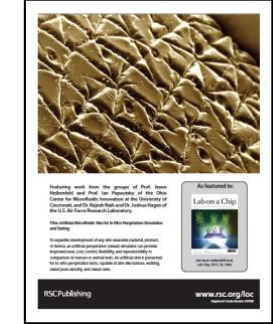
2012



2013



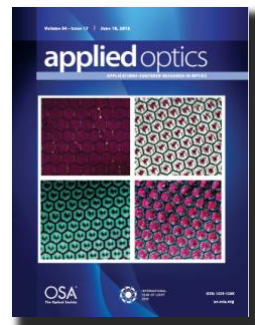
2014



2014



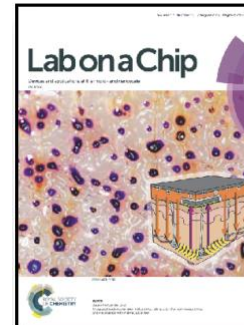
2015



2016



2017



2018



187. E. E. Nyein, U. Hommerich, J. Heikenfeld, D. S. Lee, A. J. Steckl, and J. M. Zavada, "Spectroscopic evaluation of rare earth doped GaN for full-color display applications," in Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Conference Edition (IEEE Cat. No.02CH37337), 2002, p. 654 vol.1|(670+96 suppl.).
188. J. . Seo, U. Hömmerich, D. . Lee, J. Heikenfeld, A. . Steckl, and J. . Zavada, "Thermal quenching of photoluminescence from Er-doped GaN thin films," J. Alloys Compd., vol. 341, no. 1–2, pp. 62–66, Jul. 2002.
189. A. J. Steckl, J. Heikenfeld, D. S. Lee, and M. Garter, "Multiple color capability from rare earth-doped gallium nitride," Mater. Sci. Eng. B, vol. 81, no. 1–3, pp. 97–101, Apr. 2001.
190. D. S. Lee et al., "Optimum Er concentration for in situ doped GaN visible and infrared luminescence," Appl. Phys. Lett., vol. 79, no. 6, pp. 719–721, Aug. 2001.
191. J. Heikenfeld and A. J. Steckl, "Alternating current thin-film electroluminescence of GaN:Er," Appl. Phys. Lett., vol. 77, no. 22, pp. 3520–3522, Nov. 2000.

192. J. Heikenfeld, D. S. Lee, M. Garter, R. Birkhahn, and A. J. Steckl, "Low-voltage GaN:Er green electroluminescent devices," *Appl. Phys. Lett.*, vol. 76, no. 11, pp. 1365–1367, Mar. 2000.
193. A. J. Steckl, J. C. Heikenfeld, M. Garter, R. Birkhahn, and D. S. Lee, "Rare earth doped GaN-Light emission from ultraviolet to infrared," *Compound Semiconductor Magazine*, pp. 48–52, 2000.
194. D. S. Lee, J. Heikenfeld, R. Birkhahn, M. Garter, B. K. Lee, and A. J. Steckl, "Voltage-controlled yellow or orange emission from GaN codoped with Er and Eu," *Appl. Phys. Lett.*, vol. 76, no. 12, pp. 1525–1527, Mar. 2000.
195. A. J. Steckl, M. Garter, D. S. Lee, J. Heikenfeld, and R. Birkhahn, "Blue electroluminescence from Tm-doped GaN light emitting devices," *Appl. Phys. Lett.*, vol. 75, no. 15, pp. 2184–2186, 1999.
196. A. J. Steckl, M. Garter, D. S. Lee, J. Heikenfeld, and R. Birkhahn, "Blue emission from Tm-doped GaN electroluminescent devices," *Appl. Phys. Lett.*, vol. 75, no. 15, pp. 2184–2186, Oct. 1999.
197. J. Heikenfeld, M. Garter, D. S. Lee, R. Birkhahn, and A. J. Steckl, "Red light emission by photoluminescence and electroluminescence from Eu-doped GaN," *Appl. Phys. Lett.*, vol. 75, no. 9, pp. 1189–1191, Aug. 1999.

Presentations

Invited Presentations (seminars not included here)

1. J. Heikenfeld, "Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" in P&G Event, Cincinnati, OH, USA, 2017
2. J. Heikenfeld, "Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" at LETI, Grenoble, France, 2017
3. J. Heikenfeld and Gavi Begtrup, "Wearable Sensors 2.0 – Advancing the Science and Commercialization of Sweat Biosensing" in Week of International Symposia, University of Bordeaux, Bordeaux, France, 2017
4. J. Heikenfeld, "Microfluidics as an Essential Tool for Understanding and Enabling Sensing of Analytes in Sweat" at the Microfluidics17 thematic school, Carcans, France, 2017
5. A. Hauke, A. Jajack and J. Heikenfeld, "Wearable Eccrine Sweat Biosensing: Uncovering the Real Challenges that Lie Ahead " at NSF workshop Sensing Health Symposium, Chicago, IL, USA, 2017
6. J. Heikenfeld, "Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" in OSU Brain Summit, Columbus, OH, USA, 2017
7. J. Heikenfeld, "Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" in NBMC BSW workshop, Arlington, VA, 2016
8. J. Heikenfeld, "Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" at Point-of-Care Diagnostics & Global Health World Congress, San Diego, CA, 2016
9. J. Heikenfeld, "Sweat for Continuous Biomonitoring: Opportunities, Challenges, and Impact for Cognitive Performance Sensing" in OSU Brain Summit, Columbus, OH, USA, 2016
10. J. Heikenfeld, "Progress and Challenges in Sweat Biomarker Access On Skin" in SSIST SKIN WORKSHOP, Miami, FL, USA, 2016
11. J. Heikenfeld, "A Leap Beyond the Wearable's of Today: Non-Invasive Biomarker Sensing Through Sweat" at Point-of-Care Conference, San Diego, CA, USA, 2015
12. A. Diebold and J. Heikenfeld, "Microfluidics and Antennas: Enabling the Next Generation of Epidermal Electronics" in IEEE International Symposium on Antennas and Propagation, Vancouver, Canada, 2015
13. J. Heikenfeld, "A Leap Beyond the Wearable's of Today: Non-Invasive Biomarker Sensing Through Sweat" at Wearable Tech + Digital Health, New York City, NY, USA, 2015
14. J. Heikenfeld, "Changing the way that Wearables can track your Health through Sweat Sensors" in Internet of Things World 2015, San Francisco, CA, USA, 2015
15. Z. Sonner and J. Heikenfeld, "Sweat, Microfluidics, and Sensors: Making Wearables as Good as Implantable for Physiological Monitoring" at Wearable Technologies Conference 2015, Munich, Germany, 2015
16. J. Heikenfeld, "Physiological Monitoring Through Sweat: Vast Potential Enabled by New Technology and Insights" in *EMBS Micro and Nanotechnology in Medicine Conference*, Oshu, HI, USA, 2014.
17. J. Heikenfeld, plenary speaker, "Emerging Opportunities In Bringing Wearables into Intimate Contact With Skin and Sweat", 2014 Biofusion MegaCoP Annual Symposium.
18. S. Mukherjee, J. Heikenfeld, N. Smith, M. Goulding, C. Topping, S. Norman, *et al.*, "Biprimary Dual-particle Electrokinetic Displays with 70% Reflectance and Greatly Improved Color Saturation," in *The 21st International Display Workshop*, Niigata, Japan, 2014.

19. F. Beyette and J. Heikenfeld, "Disappearing Non-Invasive Medical Electronics – The Challenges/Benefits of Wireless Diagnostics No Larger than a Band-Aid," in *MEDevice San Diego Conference*, San Diego, CA, USA, 2014.
20. J. Heikenfeld, D. Rose, J. Hagen, and I. Papautsky, "Sweat Sensors for Robust Biomarker Detection: Needs and Opportunities for Advanced Flex-Electronics and Flex-Microfluidics," in *FlexTech Alliance Headquarters*, San Jose, CA, 2013.
21. J. Heikenfeld, M. Hagedon, K. A. Dean, E. Kreit, K. Zhou, and J. Rudolph, "Electrofluidic Imaging Films for Brighter, Faster, and Lower-Cost e-Paper," in *Society of Information Display International Symposium*, Vancouver, BC Canada, 2013.
22. J. Heikenfeld, "Wearable and Non-Invasive Patches for the Next Leap in Digital Health: Multi-Biomarker Access and Sensing," in *Printed Electronics*, San Francisco, CA, USA, 2013.
23. J. Heikenfeld, "Next Generation Color EPD Technology Trends," in *Finetech Japan Conference*, Japan, 2013.
24. J. Heikenfeld, "A Critical Review of the Present and Future Prospects for e-Paper," in *Soc. Inf. Display Seminars*, Boston, 2012.
25. J. Heikenfeld, M. Hagedon, A. Russell, S. Yang, E. Kreit, K. Zhou, *et al.*, "A High-Brightness Electrofluidic Display Film," in *Society for Inf. Display Intl. Symposium*, Boston, 2012.
26. J. Heikenfeld, "Conforming Electrofluidic Technologies to the Warfighter - Applications and Materials Advances Needed at the Nanoscale ", ed. Nanotechnology for Defense, Red Rocks Nevada, 2012.
27. M. Hagedon and J. Heikenfeld, "Electrofluidic Ink Transposition?," ed. TedX Conference, Cincinnati, 2012.
28. J. Heikenfeld, "Novel Electrowetting Device Architectures for Displays and Lab-on-Chip, the Invariability of Saturation, and Materials Advances Required for Commercial Application " in *8th Int. Mtg. on Electrowetting*, Athens Greece, 2012.
29. E. Kreit, L. M. Mathger, R. T. Hanlon, P. B. Dennis, R. R. Naik, E. Forsythe, and J. Heikenfeld, "Adaptive Coloration- Knowledge Gained by Comparison of Nature and Man-Made Technologies," in *APS Meeting*, Feb. 2012.
30. J. Heikenfeld, "Advanced Color System For Displays, Now More Important than Ever," in *SID LA Advanced Display Tech. Workshop*, Feb. 2012.
31. J. Heikenfeld, "Electrofluidic Displays and the Future of E-Paper Technology," in *IDW 2011*, 2011.
32. S. Chevalliot and J. Heikenfeld, "Electrowetting Optics and Displays: Materials Implications on Performance and Reliability," in *SPIE MOEMS*, Turkey, 2011.
33. J. Heikenfeld, "Toward the Microfluidic Tattoo- Progress in Programmability, Wearability, and Key Technology Gaps," in *AFRL Workshop on Nano/Bio Sensing*, Stone Mnt, Georgia, 2011.
34. M. Hagedon, S. Yang, E. Kreit, and J. Heikenfeld, "The Present Status of e-Paper and Unique Competitive Strengths for Electrofluidic Displays," in *Int. Disp. Manuf. Conf.*, 2011.
35. J. Heikenfeld, "A New Bi-primary Color System for Doubling the Reflectance and Colorfulness of e-Paper," in *SPIE Photonics West, Proc.*, San Francisco, California, USA, 2011.
36. A. Banerjee, E. Kreit, M. Dhindsa, J. Heikenfeld, and I. Papautsky, "A new electrowetting lab-on-a-chip platform based on programmable and virtual wall-less channels," in *SPIE Photonics West*, San Francisco, California, USA, 2011.
37. J. Heikenfeld, "e-Paper: present monochrome status, and a full-color future that clearly requires breakthroughs in flexible electronics," in *NSF Workshop on Flexible Electronics*, Arlington, Virginia, Oct 25-26, 2010.
38. J. Heikenfeld, *et al.*, "Electrofluidic Displays- First Prototypes, A New Bistable Architecture, and 'Perfect' Segmented Electronic Paper," in *Intl. Disp. Workshops*, Fukuoka, Japan, 2010- voted best of e-Paper papers and best of IDW 2010 papers.
39. J. Heikenfeld, "Technology of Signage- Electronic Paper, LED Illumination, and Teleportation: Fact or Fiction in 2010 and Beyond..." in *National Signage Research and Education Conf.*, 2010.
40. J. Heikenfeld, "Electrofluidics: Microfluidics, Voltage Control, and Unlimited Device Opportunities," in *AFLR Workshop on Next-Generation Lab-on-a-Chip*, Portland, 2010.
41. L. Clapp, *et al.*, "Electronic Paper: New Performance and Device Architectures Enabled by Pigmented Electrofluidic Imaging Fluids," in *Conf. on Printed Electronics and Photovoltaics*, 2010.
42. J. Heikenfeld, "Electrowetting, New Frontiers in Materials and Laplace Pressure," in *7th Intl. Electrowetting Workshop*, Pohang, Korea, 2010- Plenary talk.
43. J. Heikenfeld, "Electrowetting Optics: Micro-fabricated Devices that Enable Optofluidic Performance Without the Microfluidic Peripherals," in *MRS Spring Symp.*, 2009.
44. J. Heikenfeld, *et al.*, "Recent Developments in Electrowetting Displays and Research of a New and Improved 'Electrofluidic' Display Platform," in *IDMC/3DSA/ASIA Display*, 2009.
45. J. Heikenfeld, N. Smith, L. Hou, and J. Zhang, "A Novel Electrowetting Approach for Optical Phased Arrays," in *IEEE LEOS 2008*, San Diego, 2008.

46. J. Heikenfeld, "Electrowetting Optics at the University of Cincinnati," in *6th Intl. Electrowetting Workshop*, Los Angeles, 2008- Plenary talk.
47. J. Heikenfeld, "Electrowetting displays, new breakthroughs may enable record color performance for flexible displays," in *IDMC/IMID 2008*, Seoul, Korea, 2008.
48. J. Heikenfeld, "Electrowetting Microprisms," in *DARPA Workshop on Optical Scanners*, San Diego, Jan 25, 2007.
49. J. Heikenfeld, "Electrowetting Optics- Fundamentals, Applications, and Opportunities/Needs for New Materials," in *American Chemical Society 234th National Meeting & Exposition*, Boston, Aug 19, 2007.
50. J. Heikenfeld, "Performance Projections and Materials Issues for Transmissive and Reflective Electrowetting Displays," in *Intl. Disp. Manuf. Conf.*, Taipei, July 3, 2007.
51. J. Heikenfeld, "Electrofluidics: A New Platform for Portable and Flexible Displays," in *ITRI Flexible Displays Symposium*, Hsinchu Taiwan, Nov 8, 2005.
52. J. Heikenfeld, "Electrowetting Display Technologies," in *5th Annual Corning Disp. Workshops*, Corning, NY, Oct 17, 2005.
53. A. J. Steckl and J. Heikenfeld, "Emissive Electrowetting Devices for Hybrid I/O TM Displays," in *IEEE LEOS*, San Juan, Puerto Rico, 2004.
54. A. J. Steckl, J. Heikenfeld, and S. Allen, "Hybrid Inorganic/Organic Light Emitting Materials and Devices for Displays and Lighting," in *Proc. 12th Intl. Conf. Electroluminescence*, Toronto, 2004.
55. A. J. Steckl, S. Allen, and J. Heikenfeld, "Hybrid Inorganic/Organic Luminescent Devices," in *2003 Intl. Semiconductor Dev. Res. Symp.*, Washington, DC, Dec 2003.
56. J. Heikenfeld and A. J. Steckl, "Black and Blue, the Impact of Pigmented Dielectrics for Electroluminescent Displays," in *10th Intl. Disp. Workshops*, Fukuoka, Japan, Dec 2003.
57. U. Hommerich, E. E. Nyein, D. S. Lee, J. Heikenfeld, A. J. Steckl, and J. M. Zavada, "Photoluminescence Studies of Rare Earth (Er, Eu, Tm) Doped GaN," in *Euro. Mat. Res. Soc.*, Strasbourg, France, June 2003.
58. A. J. Steckl, J. Heikenfeld, C. Munasinghe, D. S. Lee, Y. Q. Wang, and R. Jones, "Inorganic Electroluminescent Displays: The Impact of New Materials," in *IEEE LEOS 2003*, Tucson, AZ, Oct 2003.
59. A. J. Steckl, J. Heikenfeld, D. S. Lee, M. J. Garter, C. C. Baker, Y. Q. Wang, R. Jones, and M. Pan, "Rare-Earth-Doped GaN: Growth, Properties, and Fabrication of Electroluminescent Devices," in *Mat. Res. Soc. Mtg.*, Boston, MA, Nov 2002.
60. A. J. Steckl, J. Heikenfeld, D. S. Lee, and C. Baker, "Rare Earth Doped Gallium Nitride- From Thin Film Growth to Photonic Applications," in *SPIE Photonics West, Optoelectronics 2002*, San Jose, CA, Jan 2002.

Regular Presentations

60. A. Jajack and J. Heikenfeld, "Wearable Sweat Biosensing for Internal and Continuous Assessment of Chem/Bio Attack" in 2017 CBD S&T Conference, Long Beach, CA, USA, 2017
61. A. Hauke, N. Twine, P. Simmers, Z. Sonner, R. Norton, and J. Heikenfeld, "An integrated microfluidic system for continuous wearable sweat sampling and sensing: solving issues with nL sample volumes and skin contamination" in MicroTAS 2017, Savannah, GA, USA, 2017
62. P. Simmers, K. Li, G. Kasting, J. Heikenfeld, "Greater Than 24 Hour Sweat Stimulation By Iontophoretic Delivery Of Carbachol For Continuous Biosensing" in BMES 2017 Annual Meeting, Phoenix, AZ, 2017
63. S. Holcomb, J. Heikenfeld, C. Tabor, "Designing Liquid Metal Interfaces for Stretchable Electronic Applications" in MRS 2017 Fall Meeting, Boston, MA, USA, 2017
64. Holcomb, S., Brothers, M., Diebold, A., Thatcher, W., Mast, D., Tabor, C., & Heikenfeld, J, "Acidic-Oil Enables a Breakthrough in Electrowetting of Liquid Metal Alloys", International Meeting of Electrowetting, Taiwan, 2016
65. J. Heikenfeld, "Sweat Biosensing: technological breakthroughs enabling a new paradigm for continuous biomarker access" at HPR summit, Dayton, OH, USA, 2015
66. J. Heikenfeld, "A 100% Flipped Classroom" at CETL, Cincinnati, OH, USA, 2015
67. D. Rose, L. Hou, M. Ratterman, I. Papautsky, and J. Heikenfeld, "System-level design of an RFID Sweat Electrolyte Sensor Patch," in *Annual International Conference of the IEEE Engineering in Medicine and Biology Conference*, Chicago, IL, USA, 2014.
68. B. Cumby, J. Heikenfeld, C. Tabor, D. Mast, and M. Dickey, "Robust Pressure-Actuated Liquid Metal Devices Showing Reconfigurable Electromagnetic Effects at GHz Frequencies," in *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Memphis, Tennessee, USA, 2014.
69. S. Mukherjee, J. Heikenfeld, N. Smith, M. Goulding, C. Topping, S. Norman, *et al.*, "The Biprimary Color System for E-Paper: Doubling Color Performance Compared to RGBW," presented at the Society of Information Display, Display Week, San Diego, 2014.

70. B. Cumby, G. Hayes, M. Dickey, R. Justice, C. Tabor, and J. Heikenfeld, "Manipulating the Geometry of Metallic Fluids for Agile Electronics " in *Advances in Microfluidics and Nanofluidics*, University of Notre Dame, Indiana, USA, 2013.
71. M. Hagedon and J. Heikenfeld, "Electrofluidic Imaging Films for ePaper Displays," in *Advances in Microfluidics and Nanofluidics*, Notre Dame, IN, USA, 2013.
72. A. Russell and J. Heikenfeld, "Micro-electrofluidic Energy Harvesting: Breakthroughs in Both Materials and Device Structure," in *Advances in Microfluidics and Nanofluidics*, Notre Dame, IN, USA, 2013.
73. J. Heikenfeld, L. Hou, and D. Rose, "Building Enabling Technologies for Sensing Biomarkers in Sweat: Flexible Electronics/Microfluidics and Sweat Simulators," in *Advances in Microfluidics and Nanofluidics*, Notre Dame, IN, USA, 2013.
74. A. Harfmann and J. Heikenfeld, "Smart Light – Enhancing Fenestration to Improve Solar Distribution in Buildings," CasaClima international energy forum, 2013.
75. K. J. Rebello, J. P. Maranchi, J. E. Tiffany, C. Y. Brown, A. J. Maisano, M. A. Hagedon, and J. C. Heikenfeld, "Electrofluidic systems for contrast management," in *SPIE Defense and Security*, Baltimore, Maryland, USA, 2012, pp. 83731A-9.
76. J. Heikenfeld, "Toward the Microfluidic Tattoo- Progress in Programmability, Wearability, and the Need for Improved Biorecognition Materials, Sensing at the Human Interface: Materials, Techniques, and Devices for Monitoring Human Performance Workshop," in *Evergreen Marriott*, Stone Mountain, GA, 26-28 June 2011.
77. K. A. Dean, *et al.*, "Electrofluidic Displays: Multi-stability and Display Technology Progress," in *SID Symp. Digest*, 10.1889/1.3621018, 2011.
78. S. Chevalliot and J. Heikenfeld, "The Invariance of Electrowetting Contact Angle Saturation to Polymer, Fluid, and Interfacial Materials Properties," in *MRS Proc.*, pp. 1346: mrss11-1346-aa04-03, 10.1557/opl.2011.867, 2011.
79. J. Heikenfeld, "A New Bi-primary Color System for Doubling the Reflectance and Colorfulness of e-Paper," in *SPIE Photonics West, Proc.*, vol. 7956pp. 795608-6, San Francisco, California, USA, 2011.
80. S. Chevalliot, M. Dhindsa, and J. Heikenfeld, "Improved Electrowetting Reliability by Understanding of Ionic Transport Through Thin Film Polymers," in *Spring MRS*, 2011.
81. M. Hagedon and J. Heikenfeld, "Fluid Dosing of Pigment Dispersions in Electrofluidic Displays," in *IEEE Photonics*, 2011.
82. J. Heikenfeld, "e-Paper: Clarifying Future R&D Needs by a Fundamental Understanding of the Maximum Performance of Current Technologies," in *IEEE Photonics*, 2011.
83. P. Schultz, B. Cumby, and J. Heikenfeld, "Universal Retroreflectors," in *IEEE NAECON*, 2010.
84. E. Kreit *et al.*, "Electrofluidic Colorant Transposition for Display and Camouflage Applications," in *IEEE NAECON*, 2010.
85. Y. Shu, E. Kreit, J. Heikenfeld, and Z. Kaichang, "New Demonstration of Bistable Electrofluidic Display Pixels," in *IEEE UGIM*, p. 1, 10.1109/ugim.2010.5508850, 2010.
86. L. Hou and J. Heikenfeld, "Demonstration of a Scalable Microfabrication Process for Arrayed Electrowetting Microprisms," in *IEEE UGIM*, 10.1109/ugim.2010.5508933, 2010.
87. J. Yang, M. Dhindsa, I. Papautsky, J. Heikenfeld, S. Kwon, J. Park, and P. Rack, "Programmable Electrowetting Channels," in *IEEE UGIM*, 10.1109/ugim.2010.5508863, 2010.
88. B. Cumby, P. Schwartz, and J. Heikenfeld, "Universal Retroreflectors for Friend-Foe Identification," in *Combat ID Friend-Foe Technol. Conf.*, 2010.
89. S. Kwon, J. Noh, P. Rack, I. Papautsky, and J. Heikenfeld, "Quantitative Calculation of Oxygen Incorporation in Sputtered Indium Gallium Zinc Oxide (IGZO) Films and the Subsequent Impact on the Electron Transport and Thin Film Transistor Properties," in *Proc. of Elect. Chemi. Soc.*, p. 1821.
90. K. Zhou, K. Dean, E. Kreit, S. Yang, and J. Heikenfeld, "Reliable Electrofluidic Display Pixels without Liquid Splitting," in *Proc. SID*, p. 111, 2010- One of 7 distinguished contributed papers at SID, the world's largest display conference.
91. K. Zhou, K. Dean, and J. Heikenfeld, "Flexible Electrofluidic Displays Using Brilliantly Colored Pigments," in *Proc. SID*, p. 33.3, 2010.
92. K. A. Dean, M. R. Johnson, E. Howard, K. Zhou, and J. Heikenfeld, "Development of Flexible Electrowetting Displays for Stacked Color," in *Proc. SID 09*, San Antonio, Texas, 2009.
93. S. Kwon, J. Park, P. D. Rack, M. Dhindsa, J. Heikenfeld, A. Melechko, and D. K. Hensley, "The fabrication and characterization of electrically addressable microfluidic electrowetting channels," in *EPIBN 09*, Anchorage, Alaska, 2009.
94. J. W. Haus, W. Ha, J. Heikenfeld, N. Smith, and P. McManamon, "Electrowetting Beam Steering using microprism array designs," in *SPIE Defense*, 2009.
95. M. K. Kilaru and J. Heikenfeld, "A New Type of Information Display Device: Switchable Electrowetting Retroreflectors," in *IEEE LEOS 2008*, Newport Beach, 2008.

96. S. Kwon, J. Park, P. D. Rack, M. Dhindsa, J. Heikenfeld, and A. Melechko, "The fabrication and characterization of electrically addressable microfluidic electrowetting channels," in *Mat. Res. Soc. Fall Mtg.*, 2008.
97. N. R. Smith, L. Hou, J. Zhang, and J. Heikenfeld, "Switching Speed of Electrowetting Optics," in *IEEE UGIM 2008*, 2008.
98. B. Raj, N. Smith, L. Christy, and J. Heikenfeld, "Low Voltage Electrowetting on Composite Dielectric Layers," in *IEEE UGIM 2008*, 2008.
99. M. Dhindsa and J. Heikenfeld, "Electrical Control of Debye Screening in Liquid Microchannels for Ionic Separations," in *IEEE UGIM 2008*, 2008.
100. J. C. Heikenfeld, N. R. Smith, B. Sun, K. Zhou, L. Hou, Y. Lao, and B. Raj, "Flat Electrowetting Optics and Displays," in *SPIE MOEMS/MEMS 2008*, vol. 6887pp. 688705-7, San Jose, CA, USA, 2008.
101. M. Archdeacon, J. Thacker, and J. Heikenfeld, "Sonofluidic Textiles for Controlled and Localized Orthopedic Drug Delivery," in *6th Mtg. of the Ortho. Res. Soc.*, 2008.
102. L. Hou, N. Smith, and J. Heikenfeld, "Electrowetting Micro-prisms and Micro-mirrors," in *IEEE LEOS 2007*, pp. 457-458, 2007.
103. K. Zhou, B. Sun, and J. Heikenfeld, "Electrowetting Light Valves for Electronic Paper," in *IEEE LEOS 2007*, pp. 288-289, 2007.
104. J. Heikenfeld, "Flat Electrowetting Optics Based on Arrayed Light Valves and Microprisms," in *IEEE LEOS 2007*, pp. 206-207, 2007.
105. J. Thacker, M. Archdeacon, and J. Heikenfeld, "Sonofluidic Gated Networks for Precision-Controlled Biological Delivery Systems," in *CERMACS*, May 2007.
106. M. Dhindsa, N. Smith, J. Fowlkes, P. D. Rack, M. J. Doktycz, A. V. Melechko, M. L. Simpson, and J. Heikenfeld, "Hydrophobized Carbon Nanofibers for Multidimensional Separations," in *CERMACS*, May 2007.
107. B. Sun, K. Zhou, Y. Lao, and J. Heikenfeld, "Self-assembled alkane dosing over large electrowetting micropixel arrays," in *CERMACS*, May 2007.
108. K. Bhat, M. Agarwal, Y. Lvov, K. Varahramyan, and J. Heikenfeld, "Electrowetting Textiles: switchable wetting and tunable surface color," in *CERMACS*, May 2007.
109. M. K. Kilaru, G. Lin, J. E. Mark, and J. Heikenfeld, "Hydrophobic Dielectrics of Fluoropolymer / BaTiO₃ Nanocomposites for Low-Voltage and Charge-Storing Electrowetting Devices," in *Proc. MRS Symposium*, 2006.
110. N. R. Smith, D. C. Abeysinghe, J. W. Haus, and J. Heikenfeld, "A New Form of Flat Optics Enabled by Electrowetting Microprisms," in *IEEE LEOS 2006*, pp. 819-820, 10.1109/leos.2006.279039, 2006.
111. J. Heikenfeld, B. Sun, K. Zhou, and K. Bhat, "Flexible Electrowetting Displays for e-Paper and Electrocamouflage," in *USDC Flexible Displays Conf*, Phoenix, 2006.
112. J. Heikenfeld and N. Smith, "Technology and Applications for Flat Electrowetting Optics," in *IEEE LEOS 2006*, Montreal, 2006.
113. J. Heikenfeld, "Electrowetting for Optical Devices with Improved Speed, Operation Angle, and Transmission Efficiency," in *Great Lakes Photonics Symp.*, 2006.
114. J. Heikenfeld and A. J. Steckl, "Introduction to Electrowetting At Cincinnati: Photonic Applications," in *5th Ann. Electrowetting Mtg.*, Rochester, May/June 2006.
115. M. S. Dhindsa, N. R. Smith, J. Heikenfeld, J. D. Fowlkes, P. D. Rack, M. J. Doktycz, A. V. Melechko, and M. L. Simpson, "Electrowetting on Arrayed Carbon Nanofibers," in *IEEE Conf. on Nanotechnol.*, pp. 4-7, 10.1109/nano.2006.247610, 2006.
116. N. Smith, M. Dhindsa, J. Heikenfeld, and J. Haus, "Electrowetting Devices for Wide-Angle Beam-Steering Applications," in *5th Ann. Electrowetting Mtg.*, Rochester, May/June 2006.
117. M. Dhindsa, N. Smith, J. Heikenfeld, J. D. Fowlkes, and P. D. Rack, "Single-Liquid and Competitive Two-Liquid Electrowetting on Nanostructured Surfaces," in *5th Ann. Electrowetting Mtg.*, Rochester, May/June 2006.
118. D. Y. Kim, D. Han, J. Heikenfeld, and A. J. Steckl, "Nanoelectronics Liquid-Field Effect Transistor," in *5th Ann. Electrowetting Mtg.*, Rochester, May/June 2006.
119. N. Smith, M. Dhindsa, M. Kilaru, and J. Heikenfeld, "Novel Capacitively-Coupled Devices: Biologic and Photonic," in *Ohio Nanotechnol. Conf.*, Columbus, April 2006.
120. D. O'Neil and J. Heikenfeld, "Electrowetting Light Valves for Revolutionary Portable Displays," in *Larta Inst. Project T2 Tech. Transfer Conf.*, Los Angeles, Nov 2005.
121. J. Heikenfeld and A. J. Steckl, "Electrowetting Pixelation for Light Wave Coupling Displays," in *SID 2005 Digest*, pp. 746-749, Boston, MA, 2005.
122. J. Heikenfeld and A. J. Steckl, "Electrowetting Light Valves with Loss-Less Transmission, Unlimited View Angle, and Video Response," in *SID 2005 Digest*, pp. 1674-1677, Boston, MA, 2005.

123. S. Allen, J. Heikenfeld, and A. J. Steckl, "Hybrid Inorganic/Organic Devices for Solid State White Lighting Applications," in *12th Intl. Conf. Electrolum*, pp. 53-55, Toronto, 2004.
124. A. J. Steckl and J. Heikenfeld, "Hybrid Inorganic/Organic Luminescent Devices and Displays on Flexible Substrates," in *2004 Flexible Displays and Microelectronics Conf.*, Phoenix, AZ, Feb 2004.
125. J. Heikenfeld and A. J. Steckl, "Demonstration of Fluorescent RGB Electrowetting Devices for Light Wave Coupling Displays," in *12th Intl. Conf. Electrolum*, pp. 302-305, Toronto, 2004.
126. J. Heikenfeld, S. Allen, and A. J. Steckl, "A Novel Fluorescent Display Using Light Wave Coupling Technology," in *2004 SID Intl. Digest*, pp. 470-473, Seattle, WA, 2004.
127. J. Heikenfeld, R. A. Jones, and A. J. Steckl, "Black Dielectric Electroluminescent 160x80 Pixel Display," in *2003 SID Intl. Symp. Digest*, pp. 1098-1101, May 2003.
128. C. Munasinghe, J. Heikenfeld, R. Dorey, R. Whatmore, J. Bender, J. Wager, and A. J. Steckl, "Improved luminance and efficiency of ZnS:Mn and GaN:Eu TDEL devices using PZT thick dielectric films," in *Semiconductor Dev. Res. Symp.*, pp. 75-76, 10.1109/isdrs.2003.1272001, Dec 2003.
129. E. E. Nyein, U. Hommerich, D. S. Lee, J. Heikenfeld, A. J. Steckl, and J. M. Zavada, "Spectroscopic Studies of GaN:Er, GaN:Eu, and GaN/AlGaIn:Tm Prepared by Solid Source Molecular Beam Epitaxy," in *IEEE LEOS 2003*, vol. 2pp. 876-877 vol.2, 10.1109/leos.2003.1253081, Tucson, AZ, Oct 2003.
130. C. Baker, A. J. Steckl, and J. C. Heikenfeld, "1.5 μ m Er-doped Zinc Silicate Germanate Waveguide Amplifier," in *Proc. IEEE Lasers and Electro Optics Society Meeting*, Tucson, AZ, Oct. 2003.
131. A. J. Steckl, *et al.*, "Rare Earth Doped Gallium Nitride Flat Panel Display Devices," in *2003 Intl. Symp. Compound Semiconductors*, San Diego, CA, Aug 2003.
132. E. E. Nyein, U. Hommerich, D. S. Lee, J. Heikenfeld, A. J. Steckl, and J. M. Zavada, "Characterization of the Red Light Emission from Eu-Doped GaN," in *IEEE LEOS*, p. CWA16, Baltimore, MD, June 2003.
133. A. J. Steckl, D. S. Lee, M. Pan, and J. Heikenfeld, "Photoemission from In-situ Rare-Earth-Doped GaN Grown by MBE and MOCVD," in *Amer. Phys. Soc. Mtg.*, Austin, TX, Mar 2003.
134. E. E. Nyein, U. Hommerich, J. Heikenfeld, D. S. Lee, A. J. Steckl, and J. M. Zavada, "Spectroscopic evaluation of rare earth doped GaN for full color display applications," in *Conf. On Lasers and Electro-Optics Technical Digest*, vol. 73p. 654, 10.1109/cleo.2002.1034441, 2002.
135. J. Heikenfeld, R. Jones, and A. J. Steckl, "Matrix Addressed Black Dielectric Electroluminescent Displays for Automotive Use," in *Proc. SID Vehicular Display Symp.*, Detroit, MI, Oct. 2002.
136. J. Heikenfeld and A. J. Steckl, "High Contrast Thick Dielectric GaN Electroluminescent Displays on Glass Substrates," in *SID Intl. Symp. Digest*, vol. 33pp. 96-99, May 2002.
137. E. E. Nyein, U. Hommerich, J. Heikenfeld, D. S. Lee, A. J. Steckl, and J. M. Zavada, "Emission properties of Er-doped GaN as a function of Ga flux," in *Amer. Phys. Soc. Mtg.*, Indianapolis, IN, Mar 2002.
138. U. Hommerich, E. E. Nyein, D. S. Lee, J. Heikenfeld, A. J. Steckl, and J. M. Zavada, "Luminescent Properties of Rare Earth Doped GaN," in *Electroluminescence 2003*, Santa Fe, NM, April 2003.
139. E. E. Nyein, U. Hommerich, D. S. Lee, J. Heikenfeld, A. J. Steckl, and J. M. Zavada, "Spectroscopic Studies of Er Doped GaN as a Function of Ga Flux," in *Electroluminescence 2003*, Santa Fe, NM, April 2003.
140. A. J. Steckl, C. Munasinghe, D. S. Lee, and J. Heikenfeld, "Emission Efficiency in Electroluminescent Devices," in *Electroluminescence 2003*, Santa Fe, NM, April 2003.
141. U. Hommerich, E. E. Nyein, J. T. Seo, A. Braud, J. Heikenfeld, D. S. Lee, and A. J. Steckl, "Photoluminescence Studies of Erbium and Europium- doped Gallium Nitride prepared by Solid Source Molecular Beam Epitaxy," in *Proc. Matl. Res. Soc. Mtg*, Boston, MA, Nov. 2001.
142. R. Jones, J. Heikenfeld, and A. J. Steckl, "Rare Earth Doped GaN Black Dielectric Electroluminescent Technology for Full-Color, High-Contrast Display Applications," in *Proc. SID Vehicular Display Symp.*, 2002.
143. A. J. Steckl, J. Heikenfeld, D. S. Lee, Y. Q. Wang, and R. Jones, "Rare-earth-doped GaN Phosphors: Growth, Properties, and Fabrication of Electroluminescent Devices," in *Proc. Electroluminescence 2002*, Ghent, Belgium, Sept. 2002.
144. U. Hommerich, E. E. Nyein, J. T. Seo, A. Braud, J. Heikenfeld, D. S. Lee, and A. J. Steckl, "Photoluminescence Studies of Erbium and Europium- doped Gallium Nitride prepared by Solid Source Molecular Beam Epitaxy," in *Proc. Matl. Res. Soc. Mtg.*, Boston, MA, Nov. 2001.
145. D. S. Lee, J. Heikenfeld, and A. J. Steckl, "Low-Temperature Growth of Rare-Earth-Doped GaN Luminescent Thin Films," in *Matl. Res. Soc. Mtg.*, Boston, MA, Nov 2001.
146. A. J. Steckl, J. Heikenfeld, and D. S. Lee, "Rare-Earth-Doped GaN Phosphors for Electroluminescent Displays," in *Intl. Conf. Sci. Tech. Emis. Disp.*, pp. 95-98, Nov. 2001.
147. J. M. Zavada, U. Hommerich, J. T. Seo, A. Braud, E. E. Nyein, J. Heikenfeld, D. S. Lee, and A. J. Steckl, "Thermal Quenching Characteristics of Luminescence from RE Ions in GaN Thin Films," in *5th Intl. Conf. on Excited States of Transition Elements*, Warsaw, Poland, June 2001.

148. D. S. Lee, J. Heikenfeld, A. J. Steckl, U. Hommerich, J. T. Seo, A. Braud, and J. Zavada, "Optimum Er Concentration for In-Situ Doped GaN Visible and Infrared Luminescence," in *43rd Electronic Matl. Conf.*, vol. 79(6), pp. 719-721, Notre Dame, IN, 2001.
149. J. Heikenfeld and A. J. Steckl, "Electroluminescent Display Devices on Glass Using a High Temperature Stable GaN-based Phosphor and Thick Film Dielectric Layer," in *Mat. Res. Soc. Mtg.*, vol. 49(4), pp. 557-563, 10.1109/16.992862, Boston, MA, Nov 2002.
150. J. Heikenfeld and A. J. Steckl, "Low Cost Display Technology Utilizing Thick Dielectric Electroluminescent Devices on Glass Substrates," in *Proc. SID Symp. Vehicle Displays*, pp. 12-15, Oct. 2001.
151. J. Heikenfeld and A. J. Steckl, "Flat Panel Display Materials Issues and Options for Rare Earth Doped GaN Electroluminescent Phosphors," in *43rd Electronic Materials Conf.*, Notre Dame, IN, June 2001.
152. J. Heikenfeld and A. J. Steckl, "Rare Earth Doped GaN Electroluminescent Devices for Robust Flat Panel Displays," in *59th Device Res. Conf.*, Notre Dame, IN, June 2001.
153. E. E. Nyein, J. T. Seo, A. Blueitt, U. Hommerich, J. Heikenfeld, D. S. Lee, and A. J. Steckl, "Optical Spectroscopy of Eu-doped GaN Prepared by Solid Source Molecular Beam Epitaxy," in *Amer. Phys. Soc. Mtg.*, March 2001.
154. J. Heikenfeld and A. J. Steckl, "GaN:Er alternating current display devices," in *Matl. Res. Soc. Mtg.*, Boston, MA, Nov 2000.
155. G. Markle, J. Trent, C. Huether, C. Purdy, D. McCubbin, and J. Heikenfeld, "Linking Campus-Wide PFF Programs," in *Natl. Preparing Future Faculty Conf.*, Colorado Springs, CO, June/July 2000.
156. D. S. Lee, R. Birkhahn, J. Heikenfeld, M. J. Garter, and A. J. Steckl, "Mixed Color Emission from GaN co-doped with Er³⁺/Eu³⁺ or Er³⁺/Tm³⁺," in *Matl. Res. Soc. Conf.*, Boston, MA, Dec 1999.
157. J. Heikenfeld, D. S. Lee, M. Garter, R. Birkhahn, and A. J. Steckl, "Low-voltage GaN:Er electroluminescent devices," in *Materials Res. Soc. Mtg.*, Boston, MA, Nov 1999.
158. A. J. Steckl, R. Birkhahn, M. Garter, L. C. Chao, D. S. Lee, and J. Heikenfeld, "Rare earth activated GaN light emitting devices," in *Intl. Conf. on SiC and Related Matl.*, Research Triangle Park, NC, Oct 1999.
159. M. Garter, B. K. Lee, R. Birkhahn, J. Heikenfeld, D. S. Lee, and A. J. Steckl, "Strong 1.5 μm emission from Er-doped GaN electroluminescent devices at 400K," in *Matl. Res. Soc. Mtg.*, Boston, MA, Nov 1999.
160. A. J. Steckl, R. Birkhahn, M. Garter, L. C. Chao, D. S. Lee, and J. Heikenfeld, "Optical properties of rare earth-doped GaN and related light emitting devices," in *41st Electronic Matl. Conf.*, Santa Barbara, CA, July 1999.
161. S. Govindaswamy, J. Heikenfeld, R. Sridhara, and K. P. Roenker, "Effects of optical injection in GaInP-based heterojunction bipolar phototransistors," in *Electrochem. Soc. Mtg.*, vol. 98-12, Boston, MA, 1998.

Patents and Licensing

As of 9/1/15: at UC, Dr. Heikenfeld has: (of the current faculty) submitted the most disclosures; is in the top 10 of all time for issued patents; has licensed his inventions to more companies than any other faculty member in the history of the University of Cincinnati.

Highlights

Dr. Heikenfeld has invented across numerous disciplines. His inventions span entirely new color systems for display technology, world-record performance reflective technologies, the worlds most transparent color display technology, and more recently a large number of inventions related to biosensing technologies.

Patents

Dr. Heikenfeld has dozens of granted and dozens of pending patents, but is currently not listing his granted or pending patents here. A listing of published U.S. only patents can be found here: <https://patents.google.com/?inventor=Heikenfeld> The reason the patents are not listed explicitly is that they could aid competitive analysis against several licensees of Univ. of Cincinnati technologies.

U.C. Invention Disclosures (134 invention disclosures in total)

118-076 Discrete volume dosing system (DVDS) flow rate sensor
 118-069 Repeatable Immunoassays
 118-060 Hybrid Enzymatic Aptamer Sensors

118-050 Dry & Regulated Preconcentration
 118-033 Sweat Rate Measurement Devices – Part I
 118-031 Membrane-Coupled Continuous Sensing
 118-022 Bubble Blocking Inlets
 118-017 Digitized Sampling through Discrete Pulses and Volume Dispensing
 118-016 Sweat Biosensing Companion Devices and Subsystems
 118-011 Digitized Skin Product Sweat Testing
 118-010 Prolonged and Localized Sweat Stimulation
 118-003 Devices and Methods of Refreshing Draw Solution in Forward Osmosis-Based Sample Pre-conc.
 117-070 7mer and 5mer
 117-067 Delivery Of Reagents And Salt Management Devices
 117-066 Modular Sample Preparation Devices
 117-065 Controllable Concentration And Dilution Devices
 117-045 Laminated Membrane Electrodes Manufacturing Process/Methods
 117-035 Wearable Sweat Biosensing Devices With Active Sweat Sample Coupling
 117-028 Aptamer Functionalized Shrink-Induced High Surface Area Electrochemical Sensors
 117-027 Highly Deterministic Sweat Preconcentration
 117-013 Sweat Sensing Devices With Temperature Regulation
 117-012 Sweat Sensing Devices With Excess Sweat Flow Management
 117-011 Sweat Sensing Devices With Concentration Regulation
 117-009 Methods and Materials for Prolonged Sweat Stimulation
 117-005 Sweat Sensing Devices With Concentration Regulation
 117-003 Accurate Enzymatic Sensing Of Sweat Analytes
 117-001 Reduced Sample Volume for Sensing of Analytes Generated by Reverse Iontophoresis
 116-108 Devices With Reduced Microfluidic Volume Between Sensors And Sweat Glands
 116-107 Device With Separate Sweat Management for Stimulation and Sensor Areas
 116-104 Chemical Permeability Enhancers for Biomarker Extraction
 116-087 Reverse Iontophoresis Devices With Reduced Sample Volumes and Reduced Sampling Intervals
 116-082 Reverse Iontophoresis for Enhanced Analyte Flux Into Sweat
 116-077 A Switchable Electrowetting Polarizer Enabled by Acidified Siloxane Oil
 116-073 Advanced Biofluid Electroporation and Sensing Systems
 116-070 Electroporation Enhanced Sweat Sensing With Low Duty Cycles
 116-069 Modular Sweat Sensing Subsystems And Devices
 116-068 Self Aligning Sweat Sensors
 116-067 Head Mounted Sweat Sensing Technology
 116-066 Electroporation Enhanced Saliva Sensing
 116-054 100TH Novel Device Lab Invention Disclosure :) (yes, that is the actual title, it was a team effort...)
 116-051 Electroporation Enhanced Sweat Sensing
 116-048 Sweat Sample Preconcentration by Forward Osmosis
 116-041 Pneumonia Classification Device
 116-032 Devices Capable of Sample Concentration for Extended Biosensing of Analytes in Sweat
 116-027 Sweat Sensing Devices with Electromagnetically Shielded Sensors, Interconnects, and Electronics
 116-021 Mechanically Co-located Sweat Stimulation and Sensing
 116-008 Sweat Sensing Devices with Reduced Wicking Volume
 115-130 Sweat Indication Of Physiological States
 115-129 Sweat Sensor Cortisol Measurement
 115-128 Smart Sweat Stimulation And Sensing Devices
 115-110 Sweat Sensor with Analytical Assurance and Dry Calibration Media
 115-106 Simplified Sudomotor Axon Reflex Sweating Sampling Device
 115-105 Acidic Silicone Oil as an Insulating, Oxide-inhibiting medium for Gallium Alloys
 115-102 Sensor-Centered Flow for Reduced Sweat Sampling Intervals
 115-093 Indirect Diffusion-Based Sweat Stimulation
 115-094 Porous sensors for solutes extracted by electric field
 115-087 Sweat Sensing Devices With Reduced Collection Volumes
 115-085 Sweat Sensing Devices With Reduced Sensor Volumes
 115-083 Devices with Dissolvable Materials for Reduced Sweat Volumes
 115-079 Indirect Sweat Stimulation Techniques For Continuous Health Monitoring
 115-076 Devices with Reduced Sweat Volumes Between Sensors and Sweat Glands
 115-067 Biomarker Sensing Devices Enabled by the Nature of Sweat Composition and Microfluidics

115-065 Agile Fluid Films
115-062 Multimode Smart Windows
115-042 Voltage Gated Reservoirs of Ionophoretic Substances for Transdermal Applications
115-041 Advanced Adhesives for Chronological Sweat Sensors
115-033 Sweat Stimulation Isolation and Integrated Impedance Sensing
115-030 Smart Transdermal Delivery Patch
115-023 Sweat Sensor With Analytical Assurance
115-002 Sweat Sensor With Chronological Assurance
115-001 Combinatorial Sensing of Sweat Biomarkers Using Simple Potentiometry and Impedance Measurements
114-094 Improved Technique And Device Design For Sweat Biomarker Analysis And Skin Electrical Properties
114-092 Microneedle Design For Simultaneous Ionophoretic Drug Delivery And Sweat Collection
114-091 Interdigitated Design For Drug Delivery And Simultaneous Sweat Collection For Transdermal Patches
114-084 Advanced Sweat Sensor Adhesion, Hermetic, and Fluidic Strategies
114-078 Sweat Stim. and Sensing Devices with Minimal Skin Biomarker Contam. and Min. Sweat Flow Rates
114-077 Device Construction for Prolonged and Reliable Sweat Stimulation and Sensing
114-067 Vertical Flow Impedance Sensing Membrane Devices
114-066 Sweat Monitoring of Product Delivery and Dosage
114-061 Easily-Scalable and Grayscale-Capable Two-Particle Electrophoretic Optical Device
114-029 Solute Introduction for Integrated or Repeated Biosensing
114-021 Sweat Simulation for Integrated or Repeated Biosensing
113-045 Simpler And More Transparent Electrofluidic Light Valve
112-014 Wearable Biomarker Sensors Using Non-invasive Sweat and Blood Access
111-019 A Pigment-Mixing Bi-Primary Color System For Electrophoretic Displays
111-013 Advanced Design for Electrofluidic Displays Requiring no Pixel Registration
111-006 Low Cost Thermocapillary Dosing Device
110-079 Partial Fluid Barriers: Non-Patterned and Electrically Grounded
110-076 Fast Response Electrofluidic Displays Requiring no Fluid Pixelation
110-055 Improved Transmissive Electrofluidic/Electrowetting Displays with > 1000:1 Contrast Ratio
110-050 Self-Contained Universal Retroreflector Tag Including Switchable Electro-Optic Diffuser
110038 A New Bi-Primary Color System for Electronic Paper with ~70% White Reflectance
110037 Agile Lab-On-a-Chip Enabled by Virtual Electrowetting Channels
110033 Two Liquid Dosing Techniques for Electrofluidic Displays
110031 Electrofluidic Pixel Reservoir with Pressure that is Symmetrically Balanced with Channel Operation
110004 Fluorescent Gel Gems
109061 Fast, Bistable, and 100% White Area Display Device and Methods for Making and Operating
109054 Printed and/or Bistable Electrofluidic Displays Driven with Parallel Electrowetting/Polymer Surfaces
109029 Advanced Electrofluidic Displays: (1) Spacer Terminated Bridge; (2) Low Capacitance Reservoir
109026 Preferred Embodiments for Optically Imaged Electrowetting Printing
109016 Electrowetting Retroreflector
108110 Cationic, Anionic and Catanionic Surfactants in Electrowetting
108099 Electrofluidic Chromatophores
108054 Universal Electrofluidic Antennas
108051 8-Electrode Electrowetting Microprism Arrays
108014 Arrayed Electrowetting Prisms and Method of Manufacture
107101 Electrowetting Retroreflector
107067 Electrowetting Delta-Prisms
107039 Nanocomposite Hydrophobic Dielectrics for Bistable Electrowetting Devices
107038 Pigment Dispersions for Electrowetting Displays and Methods of Oil Dosing
107037 Non-Mechanical and Zero-Power Interference Modulated Display
107036 Electrowetting Textiles for Tunable Color Surfaces and e-Paper
107035 Advanced Electrowetting Display Architectures, Materials, and Methods of Manufacturing
107012 Active Textiles for Fluid Movement
107001 Active Signage Enabled by Full-Color Light Wave Coupling Technology
106100 Cylindrical Electrowetting Systems for Flat Optics
106096 Bio Fuel Cell
106086 Arrayed Electrofluidic Membranes for Biomimetics, Biocountermeasures, Proteomics, and Drug Discovery
106080 Adaptive Electro-camouflage
106069 Electrofluidic Display Devices and Systems
106044 Electrofluidic Display Devices and Systems

106040 NanoLEDs: Dispersed Inorganic/Organic Nano-Junctions for Advanced Flat Solid State Lighting
 106022 Electrofluidic Optical Steering Elements
 106016 Sonofluidic Device
 106010 Electrofluidic Textiles
 104042 High Speed Electrowetting Light Valve
 104016 Electronics Based on Liquid Components
 103037 Information Display Based on Lightwave Coupling
 103018 Impurity Based Electroluminescent Waveguide Amplifier
 101019 Light Emissive Display with a Black or Color Dielectric Layer
 100065 Electroluminescent Structure on Glass Using High Temperature Stable Phosphor and Thick Dielectric
 100062 Phosphors of rare-earth-doped gallium nitride for thin film alternating current electroluminescent displays
 099048 Polarity - Controlled Color Switching Electroluminescent Devices

█ Distinguished Service and Leadership

Industry

2015-Pres. Eccrine Systems – **Member of the Board, Chair of Scientific Advisory Board**
 2013-2014 Tauriga Sciences- **Scientific Advisory Board**
 2013-2014 UC Technology Commercialization Accelerator – **Governance Board**
 2011-2013 See Real Technologies - **Scientific Advisory Board**
 2012-2013 Optilux Inc. – **Scientific Advisory Board**

Professional Societies

2015-2018 IEEE EMBS - Technical Committee on Wearable Biomedical Sensors and Systems
 2014 9th International Conference on Electrowetting – **Chair and Host Organization**
 2013-Pres. Soc. for Information Display – **Member, e-Paper and Flexible Displays Subcommittee**
 2013-Pres. Soc. for Information Display Magazine - **Contributing Editor**
 2012 Soc. for Information Display Magazine – **Guest Editor, Feb./Mar. Issue**
 2009-2012 Silicon – **Associate Editor**
 2009-2014 IEEE SPAC - **National Speaker on Entrepreneurship**
 2009 SPIE Congressional Science & Technology Team – **Congressional Lobbyist**
 2008 IEEE Photonics Society – **Distinguished Lecture Committee**
 2007-2013 IEEE J. Display Technology – **Associate Editor**
 2007-2010 IEEE Photonics Society – **Board of Governors**

Notable Ranks: Fellow - National Academy of Inventors / Senior Member – IEEE / Senior Member SID.

Federal / State

2013-Pres. NSF I/UCRC – Center for Advanced Design and Manuf. of Integ. μ -Fluidics – **Founding Member**
 2009-2012 Ohio Center for Microfluidic Innovation (\$5.9M) – **Concept Lead / Founder, Director 2009-2012**
 2010 NSF ERC - **Site Reviewer**
 2006-Pres. NSF ECCS Division - **Regular NSF Panel Reviewer**

University

2016 Presidents Committee on Innovation Strategy - **Member**
 2014-Pres. Center of Excellence for (Confidential) – **Concept Lead and Strategic Coordinator**
 2013 Provost Search Committee – **President-Appointed Member**
 2013 Supporting our Transformation / The Third Century: IP Visionary Committee - **Chair**
 2013-2014 Faculty Senate – **At-Large Senator** (1st elected from engineering in many years)
 2013-2015 IPVC – **Chair** – *new models for supporting commercialization and business interactions.*
 2013-Pres. Intellectual Property Committee – **Chair, lead on BOT rule change to allow local investment in IP**
 2012-Pres. UC Forward – **Founding Member, Conceptual Co-Lead**
 2011-Pres. UC³ Certificate In Innovation Transformation – **Concept Lead / Founder, Currently Member**

2011 Performance Based Budgeting: Interdisciplinary Programs – **Concept Lead / Member**
2010-2013 Innovation Council – **Founding Member**

Fundraising

2015-Pres. Confidential \$2.5M Electronics Center – in progress – **Concept Lead and Coordinator**
2008 Congressional Appropriations – Electrofluidic Camouflage, \$3.0M - **Lead**

College / School

2017-Pres. Faculty Advisor to Engineering Tribunal (college-wide engineering student organization)
2015-2017 EECS Strategic Coordinator – **Cofound** of Org. Behavior App. to Achieving Dept. Excellence
- initiated establishment of core values for dept.
- revamped grad recruiting process
- new peer observation model with 100% faculty participation
2013 Pilot Course for e-Learning Collaboration w/ Chongqing Univ. (one of two college-wide).
2013-Pres. College Engin. & Appl. Sci. – ASSET: Accel. Stud. Succ. in E&T – **Founder**
2013-2014 School of Elect. and Comp. Sys. - Development 2.0 – **Concept Lead, Member**
2013-2014 College Engin. & Appl. Sci. – e-Learning Committee – **Member**
2013 UC Engineers™ brand within UCRI - **Concept Contributor / Co-Founder**
2010-2015 School of Elect. and Comp. Sys. - Graduate Council - **Member**
2010-Pres. School of Elect. and Comp. Sys. - Undergraduate Council - **Member**
2007-2014 Men and Women in Engineering Week (H.S. Outreach Program) – **Lead for the School**
2007-2014 School of Elect. and Comp. Sys. - Newsletter – **Concept Lead, Editor**

** of significance because it is the 1st segue for the college into required pedagogical faculty development. Model was adopted by A&S and became a campus wide effort.*

Community

2010-2013 GA Gradeschool School Council – **Member, Chair in 2013**
2015-2017 GA Gradeschool Ed-Faith Board - **Chair**

Key Mentors

This is a list of individuals that I am grateful for for their profound professional influence on me. There are other amazing individuals who are not listed here, simply because our overlap was not during a period where I was ready or fully receptive for new influence and growth. Chronologically: Dr. Andrew Steckl (excellence in research), Dr. Thomas Mantei (a higher responsibility to our clients and society), Mr. Virgil Reed (emotional intelligence), Mr. Robert Beech (entrepreneurship and leadership).

Notable Graduate and Undergraduate Achievements, Athletics

Ph.D. University of Cincinnati Distinguished Graduate Assistantship (awarded to 5 graduate students university-wide).

After completing the B.S. degree entered the direct Ph.D. program and completed the Ph.D. in 2 years, 10 months.

Certified by University of Cincinnati Preparing Future Faculty Program.

B.S. Predoctoral Honors Program

Athletics Track and field scholarship, 1994 Great Midwest Conference Indoor Distance Medley Champion, (College) 1994-1996 Conference All-Academic Team.

Athletics At age 37 finished 3rd out of 2400 competitors at 2012 Indiana Spartan Race Open obstacle/trail (Post- race. Key CrossFit benchmarks: Murph – 36:30 / Fran – 3:29 / Amanda – 9:50 / 60 min row – College) 15,202 m / 14.4 - 8 Mus: 14 min AMRAP: 60-calorie row, 50 toes-to-bars, 40 wall-ball shots, 20 lb. to 10-foot target, 30 cleans, 135 lb., 20 muscle-ups.

Research Grants and Contracts

>\$20M in research funding since 2006. Prof. Heikenfeld has been the principal investigator on >95% of his awarded grants.