Heikenfeld Vitae - Comprehensive (since 1998)

Jason C. Heikenfeld Professor of Biomedical Engineering, Electrical Engineering, Chemical Engineering, Medical Scientist Training Program.

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

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

Contact
heikenjc@ucmail.uc.edu
513-556-4763
http://www.noveldevicelab.com

Google Scholar For an automatically updated listing of scholarly work:
http://scholar.google.com/citations?user=XT0lBpMAAAAJ

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 nor participatory, but rather, to introduce technologies that are disruptive.

Personal Statement I value my career by how much I can: inspire students to achieve their professional potential; 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

2005-Pres. **University of Cincinnati**
2005 – Asst. Prof / 2009 – Assoc. Prof. / 2013 – Full Prof.

2021-Pres **Kilele Health Inc.**
CTO and CoFounder

2020-Pres **HydroLabs Inc.**
CoFounder

2019-2021. **University of Cincinnati**
Associate Vice President for Operations, UC Office of Innovation

2017-2019 **University of Cincinnati**
Assistant Vice President for Commercialization

2018-2020 **Amplify Sciences Inc.**
Cofounder

2015-2020. **Eccrine Systems Corp.,**

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Exhibit 1004
Page 1

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.
License exit to Fortune 50 company.

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
License Exit. Two distinct global products released by two licensees.

1996-1997 **3M Precision Optics Inc.**,
Projection Optics Fabrication Engineer

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

Major Honors/Awards/Achievements

2023 – elected to Fellow Status, American Institute for Medical and Biological Engineering
– elected to Fellow Status, Institute of Electrical and Electronics Engineers

2021 - After 4 years in the role as VP Operations in Office of Innovation and as 2nd in command to the Chief Innovation Officer, leading corporate relations, startups, tech transfer, events/marketing, financial, makerspace, and 1819 Innovation Hub building, through their startup phase as an Office of Innovation, major achievements include:

- inheriting an unfinished 'innovation center', filling it with corp. tenants in 2 yrs as the 1819 Innovation Hub
- during tenure imported partnerships from national/global companies (Microsoft, FIS, etc.)
- developed suite of talent/innovation product offerings and white glove concierge service to partners
- led formation of 1st of its kind regional university startup and talent partnership (7 universities)
- took action on diversity personally recruiting 3-person minority accelerator team that over 2 years transformed into regional minority startup accelerator
- dramatic turnaround in startup launches from 1-2/yr to >50 in 3 year's time
- revitalized tech-transfer policies which became a statewide model in the 'Ohio IP Promise'
- launched the Cincinnati Innovation district which directly resulted in state/private investment of ~$2B in innovation districts in Cleveland and Columbus, and before left role was already recognized nationally.

2019 - CEAS Research Award (highest career research award given in the UC college of Engineering).

2019 - NSF Television 'Science Nation' Series releases focus on: 'Sweat sensors: Engineering breakthrough tools for health diagnostics.'

2018 - Cofounded the 1st ever startup in the Cincinnati region to be accepted into Y Combinator (4th startup, confidential).

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

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Exhibit 1004
Page 2

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).

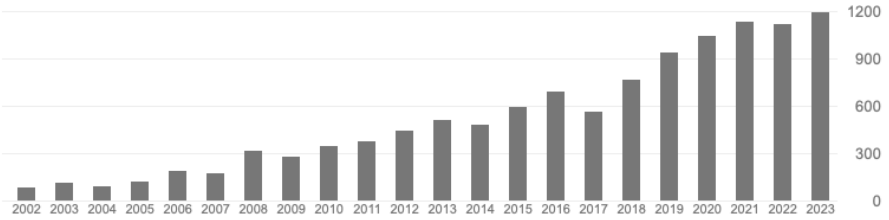
2005 - Developed technology and prototype in R&D Magazine Top 100 Award with IST Inc.

2001 - Completed a direct Ph.D. in 2 yrs. 10 mo., with 12 journal articles, 10 presentations, and multiple patents.

Publications

Google Scholar Statistics *(last updated 2023)*

	All	Since 2019
Citations	12332	5914
h-index	57	33
i10-index	142	88



Books

1. F. Mugele and J. Heikenfeld – “Electrowetting” – Wiley, 2019.

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. Mittall, 2008, ISBN 9789004165939.

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 3

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 *(as of June 2024 – for most recent see google scholar profile at: https://scholar.google.com/citations?user=XT0lBpMAAAAJ&hl=en)*

5. Watkins Z, McHenry A, Heikenfeld J. Wearing the Lab: Advances and Challenges in Skin-Interfaced Systems for Continuous Biochemical Sensing BT - Trends in Biosensing Research: Advances, Challenges and Applications. In: Lisdat F, Plumeré N, editors. Cham: Springer International Publishing; 2024. p. 223–82. Available from: https://doi.org/10.1007/10_2023_238
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8. DeBrosse MC, Suresh S, Karajic A, Kim S, Hussain S, Heikenfeld J. A novel conductive membrane sensor protection technique to mitigate redox-active interferences. Biosens Bioelectron X [Internet]. 2023;14:100366. Available from: https://www.sciencedirect.com/science/article/pii/S2590137023000638
9. Flatebo C, Conkright WR, Beckner ME, Batchelor RH, Kippin TE, Heikenfeld J, et al. Efforts toward the continuous monitoring of molecular markers of performance. J Sci Med Sport suppl Suppl 1 [Internet]. 2023 Jun;26:S46–53. Available from: https://uc.idm.oclc.org/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fefforts-toward-continuous-monitoring-molecular%2Fdocview%2F2826214996%2Fse-2%3Faccountid%3D2909
10. Young T, Clark V, Arroyo-Currás N, Heikenfeld J. Perspective—The Feasibility of Continuous Protein Monitoring in Interstitial Fluid. ECS Sensors Plus [Internet]. 2023;2(2):27001. Available from: https://dx.doi.org/10.1149/2754-2726/accd7e
11. Watkins Z, Karajic A, Young T, White R, Heikenfeld J. Week-Long Operation of Electrochemical Aptamer Sensors: New Insights into Self-Assembled Monolayer Degradation Mechanisms and Solutions for Stability in Serum at Body Temperature. ACS Sensors [Internet]. 2023 Mar 8; Available from: https://doi.org/10.1021/acssensors.2c02403
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17. Drexelius A, Kim S, Hussain S, Heikenfeld J. Opportunities and limitations of membrane-based preconcentration for rapid and continuous diagnostic applications. Sensors & Diagnostics [Internet]. 2022;1(2):222–34. Available from: http://dx.doi.org/10.1039/D2SD00002D
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19. McHenry A, Friedel M, Heikenfeld J. Voltammetry Peak Tracking for Longer-Lasting and Reference-Electrode-Free Electrochemical Biosensors. Biosensors [Internet]. 2022;12(10):782. Available from: https://uc.idm.oclc.org/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fvoltammetry-peak-tracking-longer-lasting%2Fdocview%2F2728436865%2Fse-2%3Faccountid%3D2909

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 4

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21. DeBrosse M, Yuan Y, Brothers M, Karajic A, van Duren J, Kim S, et al. A Dual Approach of an Oil–Membrane Composite and Boron-Doped Diamond Electrode to Mitigate Biofluid Interferences. Vol. 21, Sensors . 2021.
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24. Eiler J, Hansen D, Bingöl B, Hansen K, Heikenfeld J, Thormann E. In vitro evaluation of skin adhesives during perspiration. Int J Adhes Adhes [Internet]. 2020;99:102574. Available from: https://www.sciencedirect.com/science/article/pii/S014374962030035X
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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 5

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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 6

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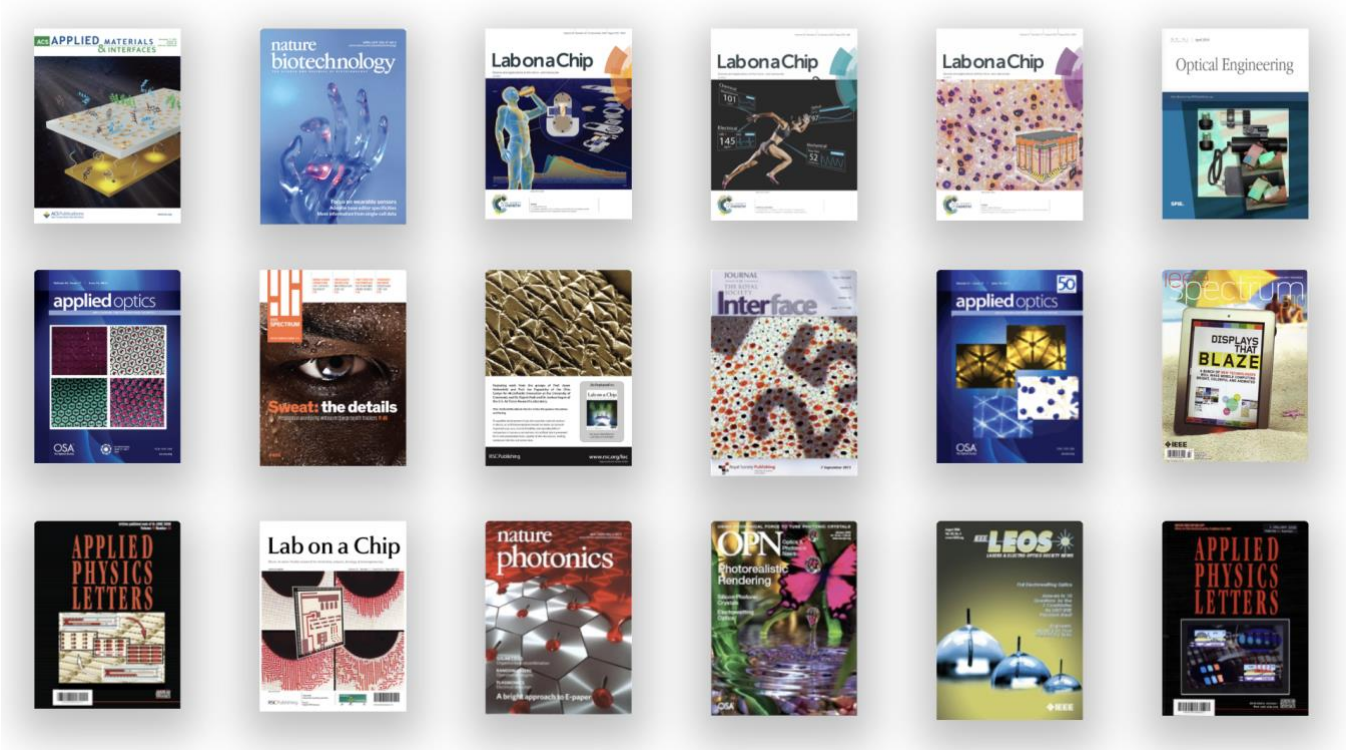
Exhibit 1004
Page 12



Presentations

Invited Presentations *(only updated up to September 1st, 2019, invited seminars not included here)*

1. J. Heikenfeld, “Minimimally- and Non-Invasive Continuous Biosensing: Frontiers for Devices and Sensors”, Gore's Advanced Materials Day, San Jose CA, 2019.
2. J. Heikenfeld, “Minimimally- and Non-Invasive Continuous Biosensing: Frontiers for Devices and Sensors”, ACS National Meeting, San Diego, 2019.
3. J. Heikenfeld, “Eccrine Sweat Biomonitoring: Addressing Fundamental Challenges that Advance the Frontiers of Biosensing”, Gore's Digital Health Innovation Day, San Jose CA, 2018.
4. J. Heikenfeld, “Eccrine Sweat Biomonitoring: Addressing Fundamental Challenges that Advance the Frontiers of Biosensing”, Wearable Tech SF, Palo Alto California, 2018.
5. J. Heikenfeld, “Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead,” Select Bio Lab-on-Chip, Mumbai, India 2018.
6. J. Heikenfeld, “Eccrine Sweat Biomonitoring: Addressing Deep Fundamental Challenges that Advance the Frontiers of Biosensing”, Sandia National Labs, 2018.
7. J. Heikenfeld, “Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead”, P&G Global Innovation Event, Cincinnati Ohio.
8. J. Heikenfeld, “Conducting Human Subjects Research in a Basic Research Department,” OHRP Workshop 2017, Cincinnati Ohio, 2017.
9. J. Heikenfeld, “My Seizure Gauge – future roles for minimally- and non-invasive sensing modalities”, Epilepsy Foundation, Washington DC, 2017.
10. J. Heikenfeld, “Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" in P&G Event, Cincinnati, OH, USA, 2017
11. J. Heikenfeld, “Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" at LETI, Grenoble, France, 2017
12. 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
13. J. Heikenfeld, “Microfluidics as an Essential Tool for Understanding and Enabling Sensing of Analytes in Sweat" at the Microfluidics17 thematic school, Carcans, France, 2017
14. 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

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 13

15. J. Heikenfeld, “Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" in OSU Brain Summit, Columbus, OH, USA, 2017
16. J. Heikenfeld, “Wearable Eccrine Sweat Biosensing: Uncovering The Real Challenges That Lie Ahead" in NBMC BSW workshop, Arlington, VA, 2016
17. 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
18. J. Heikenfeld, “Sweat for Continuous Biomonitoring: Opportunities, Challenges, and Impact for Cognitive Performance Sensing" in OSU Brain Summit, Columbus, OH, USA, 2016
19. J. Heikenfeld, “Progress and Challenges in Sweat Biomarker Access On Skin" in SSIST SKIN WORKSHOP, Miami, FL, USA, 2016
20. 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
21. 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
22. 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
23. 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
24. 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
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41. S. Chevalliot and J. Heikenfeld, "Electrowetting Optics and Displays: Materials Implications on Performance and Reliability," in *SPIE MOEMS*, Turkey, 2011.
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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 14

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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 15

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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 16

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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 17

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iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 18

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Patents and Licensing

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 19

Dr. Heikenfeld within his first 10 years at UC had submitted the most invention disclosures; had the most patents; and has licensed his inventions to more companies than any other faculty member ever at the Univ. of Cincinnati.

His work includes successfully taking products to market with his past startups and partnerships leading to products such as toys (Crayola), electro-optical advertising technology (Sun Chemical), sweat biosensors (Hydrolabs), and smart windows (Crown Electrokinetics).

Patents

Dr. Heikenfeld has >100 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 for our market competitors.

U.C. Invention Disclosures **(234 invention disclosures in total)**

2024-058 - In-Vivo Electrochemicsl Affinity Biosensing Without Need For Sensor Stablization
2024-052 - In-Vivo Electrochemical Affinity Biosensing With Artifact Rejection
2024-050 - Advanced Sampling Methods For Faster Molecular Sensor Response To Highly Dilute Analytes
2024-011- Electrochemical Biosensors With Sensor Response Dependent On Proximity Of Two Or More Tags
2024-009 - Reagent-Free High-Responsivity Electrochemical Measurement Of Proteins
2024-007 - Factory And In-Vivo Calibration Of Electochemical Aptamer Sensors
2023-097 - Surface Bound Aptamer Sandwich Sensors
2023-095 - Dual-Mode Electrochemical Analyte And Oxygen Sensors
2023-094 - Multimodal Electrochemical And Wearable Sensors
2023-087 - Optical Aptamer Biosensors For In-Vivo Sensing
2023-082 - Aptamer Biosensors With Mixed-Conductivity Monolayers
2023-078 - Automatically Analyzed Continuous Molecular Biosensing For Inherently Periodic Analytes
2023-075 - Biosensor Depths In Skin That Are Not Predetermined
2023-069 - Electrochemical Aptamer Sensors With Mixed Charge Blocking Layers
2023-068 - Non-Target Molecule Assistance Equilibrium Assisted Aptamer Incubation
2022-140 – Biosensor System For Drug Efficacy Monitoring
2022-135 – Biosensor Devices With Waveguide Cores Containing Affinity-Based Probes
2022-134 – Dermal Protein Sensing With Accurate Blood Correlation
2022-096 – Multimode Sensor Integration Onto Needle-Based Sensing Systems
2022-061 – Electrochemical Aptamer Sensors With Stable Blocking Layers And A Zero-Gain Frequency
2022-055 - Biosensor Measurement of Tracer Compounds
2022-053 - Electrochemical Aptamer Sensors With Signal Amplification Via Multiple Redox Tags
2022-052 - Electrochemical Aptamer Sensors With Two Or More Binding Sites
2022-049 – Electrochemical Aptamer Sensors With Non-Monolayer Blocking Layers
2022-025 – Electrochemical Aptamer Sensor Monolayer Incubation With Improved Stability
2022-023 – Shelf-Stable Sterilization Of Aptamer-Sensors For In-Vivo Measurement In Humans
2022-020 - Robust Calibration-Free Devices And Methods For Electrochemical Aptamer Sensors
2022-017 -Depletion-Limited Analyte Sensing With Non-Equilibrium Binding Probes
2022-015 – Aptamer Sensors With Temperature Correction
2021-162 - Prot. of Electrochemical Aptamer Based Sensors from Enzymatic Degradation in Biofluids
2021-161 – Aptamer Sensors With Reference And Counter Voltage Control
2021-130 - Solute-Phase Electrochemical Aptamer Sensors With Rapid Time-To-Measurement
2021-098 – Reduced Electronic Sampling Of Aptamer Sensors
2021-083 – Solution Phase Aptamer Sensors with an Immobilized Anchor Aptamer
2021-082 – Solution-Phase Aptamer Sensor Based on Amperometry
2021-071 – Continuous Optical Aptamer Sensors
2021-064 - Solute-Phase Electrochemical Aptamer Architectures
2021-063 – Electrode Cleaning For Solute-Phase Electrochemical Aptamer Sensors
2021-062 - Electrochemical Aptamer Sensors With Aptamers Bound Adjacent To The Electrode
2021-059 – Solute-Phase Electrochemcial Aptamer Sensing With Aptamer Isolation
2021-038 – Continuous Aptamer Sensing Devices with Improved Longevity By Gating Of Sample Fluid

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 20

2021-039 – Electrochemical Sensors with Reduced Redox Background Current
2021-040 – Solute-Phase Electrochemical Aptamer Sensors for Improved Device Longevity
2021-034 – Pre-conditioned ready to use aptamers
2021-025 – Small Volume Aptamer Sensing Without Solution Impedance or Analyte Depletion
2021-022 – Reduced Duty Cycle Sampling of Aptamer Sensors
2021-019 – Highly Chemically Stable Aptamer Sensors
2021-023 – Continuous Aptamer Sensors with Solute Passivation
2021-024 – Continuously Chemically Enhanced Aptamer Sensors
2021-020 – Continuous Ovulation Monitoring Platform
2021-021 – Continuous Glucose Sensing with Aptamers
2021-018 – Abrasion-protected Microneedle and Indwelling Aptamer Sensors
2021-006 – A Sampling Method to Increase Electrochemical Aptamer-Based Sensor Longevity
2020-123 – Integrative EAB Sensors for Viral Detection in Biofluids Such as Saliva
2020-114 – Continuous Aptamer-Based Sensing Of Glucose In Interstitial Fluid
2020-111 – Fluid Sensors Based On Measuring A Swellable Volume
2020-109 – 3 Step Preconcentration and Detection System
2020-096 – Unified Method Sweat Sample Collector
2020-063 – Wearable Biotoxin Detection Device
2020-049 – High Pressure Preconcentrator
2020-032 – Shelf-Stable Aptamer Sensors
2020-012 – Bi-component Thinner Hydrophobic Membranes for Biosensing
2020-001 – Microneedles Aided by Expanding Gel Tips
2019-091 - Device To Measure Fluid Exposure
2019-069 - Diffusion-Based Aptamer Sensing of ISF Without Motion Artifacts
2019-064 - Continuous Extraction And Sensing Of Interstitial Fluid
2019-063 - Continous Ex-Vivo Affinity-Based Sensing Of Interstitial Fluid
2019-061 - Volume modulated Preconcentration Device
2019-056 - Integrated devices to contin. measure bound and unbound analyte fractions in peripheral biofluids
2019-054 - Hydrophobic membrane auto-stops for vacuum-driven preconcentration systems
2019-053 - Water vapor exclusion in vacuum-actuated microfluidic devices
2019-052 - How to Use a Low-Cost Disposable to Turn A Smart Watch Into an Accurate Sweat Sensor
2019-041 - Membrane-based sample concentrator with enhanced coupling to absorbent materials
2019-038 - Sweat Rate Sensors Based on Measuring A Swellable Volume
2019-037 - Quality assurance of collected interstitial fluid samples
2019-036 - Interstitial fluid sensing using open and closed microfluidics
2019-032 - Mechanically Actuated Vacuum Preconcentration Device
2019-031 - Fast Osmotic Draw Systems For Use With Ion-Porous Membranes
2019-029 - Regulated And Shelf-Stable Vacuum Preconcentration Device
2019-023 – Hexagonal Nanofluidic Microchannels for Biofluid Sensing Devices – Joint with UC
2019-024 – 9 Inventions – Eccrine Systems Confidential Only
118-115 Prolonged Integrated Sweat Stimulation By Transdermal Diffusion
118-097 Ultrastable Dispersed Microdroplet Solutions For Hydrophobic Small Molecule And Gas Sensing
118-089 Membrane Enhanced Sensors
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

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 21

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 Sensign 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
116-054100TH 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 Iontophoretic Substances for Transdermal Applications
115-041 Advanced Adhesives for Chronological Sweat Sensors
115-033 Sweat Stimulation Isolation and Integrated Impedance Sensing
115-030 Smart Trandermal 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 Iontophoretic 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

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 22

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 Electo-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 Teminated 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

iRhythm, Inc. / Welch Allyn, Inc.
Exhibit 1004
Page 23

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2015-2020 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

2017-Pres. UC Entrepreneurial Awards Committee, ***Chair***
2016 Presidents Committee on Innovation Strategy - ***Member***
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.*
2013-2017 Intellectual Property Committee – ***Chair,*** *lead on BOT rule change to allow local investment in IP*
2012-2015 UC Forward – ***Founding Member, Conceptual Co-Lead***
2011-2013 UC^3 Certificate In Innovation Transformation – ***Concept Lead / Founder***
2011 Performance Based Budgeting: Interdisciplinary Programs – ***Concept Lead / Member***
2010-2013 UC Innovation Council – ***Founding Member***

Fundraising

2008 Congressional Appropriations – Electrofluidic Camouflage, $3.0M - ***Lead***

College / Dept.

2023-Pres Biomedical Engineering RPT Chair
2017-2019 Facutly 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).

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Exhibit 1004
Page 24

2013-2016	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***
2010-2017	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 the1st 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 to 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 stakeholders and society), Virgil Reed (emotional intelligence), Robert Beech (entrepreneurship and leadership, Tarita Preston (understanding other people and oneself), David Adams (leadership), Nancy Koors (operational excellence).

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 (College)	Track and field scholarship, 1994 Great Midwest Conference Indoor Distance Medley Champion, 1994-1996 Conference All-Academic Team.
Athletics (Post-College)	At age 37 finished 3rd out of 2400 competitors at 2012 Indiana Spartan Race Open obstacle/trail race. Key CrossFit benchmarks (~age 40): Murph – 36:30 / Fran – 3:29 / Amanda – 9:50 / 60 min row – 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.

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Exhibit 1004
Page 25