

## BIOGRAPHICAL SKETCH

NAME Eric R. Henderson	POSITION TITLE		
eRA COMMONS USER NAME ehenderson	Professor, Iowa State University Genetics, Development and Cell Biology		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of California, Los Angeles, CA	BA	05/79	Biology
University of California, Los Angeles, CA	Ph.D.	05/84	Molecular Biology
University of California, Berkeley, CA	Post-Doc	05/87	Molecular Biology

### A. Personal Statement

The goal of our current work is to create a self-assembling DNA nanodevice for measuring molecular forces. I have twenty-eight years of research leadership experience, much of it in the area of nucleic acid structure and function (telomeres and ribosomes) and sixteen years of industrial experience. I've been involved in the invention and development of several commercial products (Nano eNabler™, Sindex™ chips, Surface Patterning Tools (SPTs™), UV/Ozone ProCleaner™, ViriChip™). I parted ways with my first company, BioForce Nanosciences, Inc. (est. 1994) after it became a publicly traded entity. I currently work full time as a researcher and educator at Iowa State University and recently founded a new startup called Creodyne, llc.

Science is my day job but I also write novels and music, am an exercise fanatic, and have an amazing extended family for whom I am eternally grateful. More info here: <http://www.erichenderson.com>

### B. Positions and Honors

#### Positions and Employment

1987-1993 Assistant Professor of Zoology and Genetics, Iowa State University, Ames, IA  
 1993-1996 Associate Professor of Zoology and Genetics, Iowa State University, Ames, IA  
 1996- Professor of Genetics, Development and Cell Biology, Iowa State University, Ames, IA  
 1994-2008 Founder, BioForce Nanosciences, Ames, IA  
 2009- Founder, Creodyne, LLC

#### Awards and Honors

10 patents awarded  
 US 5,763,768; "Analytical Method Using Modified Scanning Probes"  
 US 6,146,899; "Height Referencing Biochemical Cassette"  
 US 6,573,369; "Method and apparatus for solid state molecular analysis"  
 US 6,716,578; "Method for solid state genome analysis"  
 US 6,897,015; "Device and Method of Use for Detection and Characterization of Pathogens and Biological Materials"  
 US 6,998,228; "Method and Apparatus for Solid State Molecular Analysis"  
 US 7,008,769; "Nanoscale Molecular Arrayer"  
 US 7,060,448; "Evaluating Binding Affinities by Force Stratification and Force Panning"  
 US 7,344,832; "Method and Apparatus for Molecular Analysis in Small Sample Volumes"

### C Selected Peer Reviewed Publications (Selected from 97 peer-reviewed publications)

1. R. Lutz, J. Lutz, J. Lathrop, T. Klinge, E. Henderson, D. Mathur, and D. Abo Sheasha, (2012) Engineering and verifying requirements for programmable self-assembling nanomachines, Proceedings of the Thirty-Fourth International Conference on Software Engineering (ICSE 2012, Zurich, Switzerland, June 2-9, 2012), pp. 1361-1364.
2. Lutz, Robyn R., Lutz, Jack H., Lathrop, James I., Klinge, Titus H., Mathur, Divita, Stull, Don M., Bergquist, Taylor G. and Henderson, Eric R. (2012) Requirements analysis for a product family of DNA nanodevices, Proceedings of the Twentieth IEEE International Requirements Engineering Conference (RE 2012, Chicago, IL, September 24-28, 2012), pp. 211-220.
3. Mathur, D. and Henderson, E. (2013) Complex DNA Nanostructures from Oligonucleotide Ensembles, ACS Synthetic Biology, 2, 180-185.
4. Xu, J., Lynch, M., Huff, J., Mosher, C., Ding, G., and Henderson, E. (2004) Microfabricated quill-type deposition tools for the creations of biological micro/nano arrays. Biomedical Microdevices 6(2): 117-123.
5. Huff, J.L., Lynch, M.P., Nettikadan, S., Johnson, J.C., Ding, G., and Henderson, E. (2004) Label-free protein and pathogen detection using the atomic force microscope. J. Biomol. Screening, 9(6): 491-498.

#### Representative earlier publications

6. Henderson, E., Oakes, M., Clark, M.W., Lake, J.A., Matheson, A.T. and Zillig, W. (1984) A new ribosome structure. Science 225, 510-512.
7. Henderson, E. Hardin. C.W., Wolk, S. Tinoco, I., Jr. and Blackburn, E.H. (1987) Telomeric DNA oligonucleotides form novel intramolecular structures containing guanine.guanine base pairs., Cell 51, 899-908
8. Henderson, E. (1992) Nanodissection of supercoiled plasmid DNA by atomic force microscopy. Nucleic Acids Res. 20(3): 445-447
9. Henderson, E., Haydon, P.G., and Sakaguchi, D.A. (1992) Actin filaments dynamics in living glial cells imaged by atomic force microscopy. Science 257: 1944-1946.
10. Ahmed, S., A. Kintinar, and Henderson, E. (1994) Human telomeric C-strand tetraplexes. Nature Structural Biology, 1, 83-88.
11. Marsh, T.C., Vesenska, J., and Henderson, E. (1995) A new DNA nanostructure imaged by scanning probe microscopy. Nuc. Acids Res. 23(4): 696-700.
12. Henderson, E. (1998) Microminiaturized immunoassays using Atomic Force Microscopy and compositionally patterned antigen arrays. Anal. Chem., 70 (7), 1233-1241.

## **D. Research Support**

### **Ongoing Research Support**

NSF 1247051

PI Jack Lutz; Co-PIs, James Lathrop, Robyn Lutz, Eric Henderson

Awarded 10/1/2012

INSPIRE: Robust Molecular Programming: Advances in the Design and Verification of Reliable Self-Assembling Nanosystems

The goal of this research collaboration is to continue (based on results of NSF 1143830 below) the integration of computational science approaches to systems validation with wet laboratory research in the area of nanoscale systems design.

### **Completed Research Support (in the past 3 years)**

NSF 1143830

PI Jack Lutz; Co-PIs Ting Zhang, Robyn Lutz, James Lathrop, Eric Henderson

10/1/2011 - 8/31/2012

EAGER: Collaborative Research: Modeling and Analysis of Molecular Programming and Nanoscale Self-Assembly.

The goal of this research collaboration is to integrate computational science approaches to systems validation with wet laboratory research in the area of nanoscale systems design.

Bill and Melinda Gates Foundation GCE Grant Number: OPP1059568

PI Eric Henderson

5/1/2012 - 10/31/2013

Nanodevice for Pathogen Detection.

The goal of this research was the initial design and prototype construction of the self-assembling DNA nanodevice that evolved into the "Slider" for which funding is currently being sought.