BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Annelise E. Barron, Ph.D.	Associate Professor of Bioengineering and, by courtesy, Chemical Engineering
eRA COMMONS USER NAME (credential, e.g., agency login) AEBARRON	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Washington, Seattle, WA	B.S. *cum laude*	1990	Chemical Engineering
University of California, Berkeley, CA	Ph.D.	1995	Chemical Engineering
ACLARA BioSciences, Inc.	Postdoc	1995	Molecular Biotechnology
University of California, San Francisco, CA	Postdoc	1996	Pharm. Chemistry

A. Positions and Honors

Positions and Employment

2007-present W.M. Keck Associate Professor (tenured), Stanford University, Dept. of Bioengineering; courtesy appt. in Dept. of Chemical Engineering. Research at interfaces between polymer science, biotechnology and medicine. *Research areas:* Bioconjugates, Biomimetics, Bioseparations.

2006 – 2007 Full Professor (tenured), Northwestern University, Department of Chemical & Biological Engineering**,** with Courtesy Appointment in Chemistry (Organic Division).

2003 – 2006 Associate Professor (tenured), Northwestern University, Dept. of Chemical & Biological Chemistry, with Courtesy Appointment in Chemistry (Organic Division).

1997 – 2003 Assistant Professor (tenure-track), Northwestern University, Dept. of Chemical Engineering.

2006 – 2007 Full Member, Robert H. Lurie Comprehensive Cancer Center, Northwestern University, IL.

1996 – 1996 NIH-NRSA Postdoctoral Fellow, University of California, San Francisco, Dept. of Pharmaceutical Chemistry. *Mentors:* Prof. Ken A. Dill (UCSF), Dr. Ronald N. Zuckermann (Chiron Corp.). Synthesis and spectroscopic studies of biomimetic poly-*N*-substituted glycines.

1995 – 1995 Postdoctoral Research Associate, ACLARA BioSciences. Mentor: Herbert H. Hooper, Ph.D., Vice President and Director of Research. Synthesis, characterization, and testing of novel acrylamide-based copolymers for DNA sequencing by capillary electrophoresis.

1990 – 1995 Graduate Student and Ph.D. Candidate (Research and Teaching Assistant), University of California, Berkeley. Advisors: Professors Harvey W. Blanch and David S. Soane. Thesis: *Capillary electrophoresis of DNA in uncrosslinked polymer solutions: Experiment and Theory.*

Other Experience and Professional Memberships

2008-present Member, Stanford University Comprehensive Cancer Center

2004-2007 Director, Northwestern University's NIH/NRSA Predoctoral Training Program in Biotechnology

2004-2007 Member, Advisory Committee to the Director of the NIH (Dr. Elias Zerhouni)

2006-2007 NIH Director's Liaison to the NIH Council of Public Representatives

2006-present Member, Biomolecular Materials and Processes (BMAP) Committee of the National Research Council (NRC), National Academies of Science

2006-2010 Permanent member, NIH Synthetic & Biological Chemistry B Study Section

2005-2006 Permanent Member, NIH Instrumentation and Systems Development Study Section

Honors

Nov. 2008 Invited lecture, National Academy of Engineering "Japan-America Frontiers of Engineering" Symposium, Kobe, Japan (Nov. 16-19, 2008). *(Topic: Ultra-fast DNA sequencing)*

Nov. 2008 Session chair at National Academy of Science "First American-French Kavli Frontiers of Science" Symposium, Roscoff, France (Nov. 19-22, 2008). *(Topic: "Controlling the Fold")*

2003-2007 Invited lecturer at nine recent Gordon Conferences: Antimicrobial Peptides (2007); Peptides, Chemistry & Biology of (2006); Biointerface Science (2006); Colloidal, Macromolecular, and Polyelectrolyte Solutions

	(2006); Organic Structures and Properties (2006); Microfluidics, Physics & Chemistry of (2005); Bioorganic Chemistry (2005); Elastomers, Networks & Gels (2005); Analytical Chemistry (2003)
2005	2005 Thiele Lecturer in Chemical Engineering, University of Notre Dame
2002	Camille Dreyfus Teacher-Scholar Award
2002	DuPont Young Professor Award
1999	Presidential Early Career Award for Scientists and Engineers, 1999, through NIH/NHGRI
1998-1999	Beckman Young Investigator Award
1996	NIH National Research Service Award (Postdoctoral Fellowship #1 F32 GM 18112)
1994	University of California Minority Dissertation Year Fellowship
1994	Matheson Fellowship in Chemical Engineering
1994	Dow Excellence in Teaching Award, 1994, U.C. Berkeley Department of Chemical Engineering
1993	Outstanding Graduate Student Instructor Award, U.C. Berkeley Dept. of Chemical Engineering
1993	U.C. Berkeley Provost's Research Fund Grant
1990-1993	U.C. Berkeley Chancellor's Minority Pre-doctoral Fellowship
1986-1990	National Merit Scholar and Recipient of Associated Four-Year Scholarship
1989	H.K. Benson Chemical Engineering Tuition Scholarship
1987, 1988	University of Washington Undergraduate Merit Scholarship (two consecutive years)
1986	Tektronix Foundation Merit Scholarship
1986	National Hispanic Scholar

B. Selected peer-reviewed publications (reverse chronological order, 2006-2010; excerpted from ~100 total**).**

J. Coyne Albrecht, J.S. Lin, A.E. Barron, 'A 265-base DNA sequencing read by capillary electrophoresis with no separation matrix,' *Anal. Chem.* (2010) accepted for publication (12/7/10), *in press*.

B.E. Root, A.K. Agarwal, D.M. Kelso, **A.E. Barron**, 'Purification of HIV RNA from serum using a polymer capture matrix in a microfluidic device,' (2010) *Anal. Chem.*, accepted for publication (12/14/10), *in press*.

M. Hrynyk, M. Martins-Green, **A.E. Barron**, R.J. Neufeld, 'Sustained prolonged topical delivery of bioactive human insulin for potential treatment of cutaneous wounds,' *International J. Pharmaceutics* (2010) 398, 146-154.

N.E. Davis, S. Ding, R.E. Forster, D.M. Pinkas, **A.E. Barron**, 'Modular enzymatically crosslinked protein polymer hydrogels for in situ gelation,' *Biomaterials* (2010) 31, 7288-7297.

M.T. Dohm, N.J. Brown, S.L. Seurynck-Servoss, J.B. de la Serna, **A.E. Barron**, 'Mimicking SP-C palmitoylation on a peptoid-based SP-B analogue markedly improves surface activity,' *Biochim. Biophys. Acta-Biomembranes* (2010) 1798, 1663-1678.

M.T. Dohm, B.P. Mowery, A.M. Czyzewski, S.S. Stahl, S.H. Gellman, **A.E. Barron**, 'Biophysical Mimicry of Lung Surfactant Protein B by Random Nylon-3 Copolymers,' *J. Am. Chem. Soc.* (2010) 132, 7957-7967.

L.S. Karfeld-Sulzer, E.A. Waters, N.E. Davis, T.J. Meade, **A.E. Barron**, 'Multivalent Protein Polymer MRI Contrast Agents: Controlling Relaxivity via Modulation of Amino Acid Sequence,' *Biomacromolecules* (2010) 11, 1429-1436.

J. Seo, **A.E. Barron**, R.N. Zuckermann, 'Novel peptoid building blocks: Synthesis of functionalized aromatic helix-inducing submonomers,' *Organic Letters* (2010) 12, 492-495.

A.R. Statz, J. Kuang, C. Ren, **A.E. Barron**, I. Szleifer, P.B. Messersmith, 'Experimental and theoretical investigation of chain length and surface coverage on fouling of surface grafted polypeptoids', *Biointerphases* (2009) 4, FA22-FA32.

M. Uchida, G. McDermott, M., M.A. Le Gros, M. Myllys, C. Knoechel, **A.E. Barron**, C.A. Larabell, 'Soft X-ray tomography of phenotypic switching and the cellular response to antifungal peptoids in *Candida albicans*,' *Proc. Natl. Acad. Sci. USA* (2010) 106, 19375-19380. (*Online publication date*: Nov. 17, 2009).

J. Seo, N. Michaelian, S.C. Owens, S.T. Dashner, A.J. Wong, **A.E. Barron**, M.R. Carrasco, 'Chemoselective and microwave-assisted synthesis of glycopeptoids', *Organic Letters* (2009) 11, 5210-5213.

M.T. Dohm, S.L. Seurynck-Servoss, J. Seo, R.N. Zuckermann, **A.E. Barron**, 'Close mimicry of lung surfactant protein B by "clicked" dimers of helical, cationic peptoids,' Biopolymers (2009) 92, 538-553.

J.C. Rea, R.F. Gibly, N.E. Davis, **A.E. Barron**, L.D. Shea, 'Engineering surfaces for substrate-mediated gene delivery using recombinant proteins,' Biomacromolecules (2009) 10, 2779-2786.

N. Davis, L. Karfeld-Sulzer, S. Ding, **A.E. Barron**, 'Synthesis and characterization of a new class of cationic protein polymers for multivalent display and biomaterial applications,' *Biomacromolecules* (2009) 10, 1125-1134. ID: bm-2008-01348g.

B.E. Root, B. Zhang, **A.E. Barron**, 'Size-based protein separations by microchip electrophoresis using an acid-labile surfactant as a replacement for SDS', *Electrophoresis* (2009) 30 (12), Special Issue SI, 2117-2122.

R.E. Forster, D.G. Hert, T.N. Chiesl, C.P. Fredlake, **A.E. Barron**, 'DNA migration mechanism analyses for applications in capillary and microchip electrophoresis,' Electrophoresis (2009) 30 (12), Special Issue SI, 2014-2024.

A.R. Statz, J.H. Kuang, C.L. Ren, **A.E. Barron**, I. Szleifer, P.B. Messersmith, 'Experimental and theoretical investigation of chain length and surface coverage on fouling of surface-grafted polypeptoids,' *Biointerphases* (2008) 4, FA22-FA32.

R.E. Forster, T.N. Chiesl, C.P. Fredlake, C.V. White, **A.E. Barron**, 'Hydrophobically modified block copolymers for fast, high-resolution DNA sequencing in microfluidic chips,' *Electrophoresis* (2008) 29, 4669-4676.

B.E. Root, M.L. Hammock, **A.E. Barron**, 'Thermo-responsive *N*-alkoxyacrylamide polymers as a sieving matrix for high-resolution DNA separations on a microfluidic chip,' *Electrophoresis* (2008) 29, 4677-4683.

C.P. Fredlake, D.G. Hert, B.E. Root, **A.E. Barron**, 'Polymer systems designed specifically for DNA sequencing by microchip electrophoresis,' *Electrophoresis* (2008) 29, 4652-4662.

D.G. Hert, C.P. Fredlake, **A.E. Barron**, 'DNA sequencing by microchip electrophoresis using mixtures of high- and low-molar mass poly(*N,N*-dimethylacrylamide) matrices,' *Electrophoresis* 2008, 29, 4663-4668.

D.G. Hert, C.P. Fredlake, **A.E. Barron**, 'Advantages and limitations of next-generation sequencing technologies: A comparison of electrophoresis and non-electrophoresis methods,' *Electrophoresis* (2008) 29, 4618-4626. (Review article)

S.A. Greenspoon, S.H.I. Yeung, K.R. Johnson, W.K. Chu, H.N. Rhee, A.B. McGuckian, C.A. Crouse, T.N. Chiesl, **A.E. Barron**, J.R. Scherer, J.D. Ban, R.A. Mathies , "A forensic laboratory tests the Berkeley microfabricated capillary array electrophoresis device, *J. Forensic Sci.* 2008, 53, 828-837.

J.C. Rea, R.F. Gibly, **A.E. Barron**, L.D. Shea, 'Self-assembling peptide-lipoplexes for substrate-mediated gene delivery' *Acta Biomaterialia* (2009) 5, 903-912.

J.C. Rea, **A.E. Barron**, L.D. Shea, 'Peptide-mediated lipofection is governed by lipoplex physical properties and the density of surface-displayed amines.' *J. Pharm. Sci.* (2008) 97, 4794-4806.

A.R. Statz, J.P. Park, N.P. Chongsiriwatana, A.E. Barron, P.B. Messersmith, 'Surface-immobilised antimicrobial peptoids,' *Biofouling* (2008) 24, 439-448.

A.R. Statz, **A.E. Barron**, P.M. Messersmith, 'Protein, cell, and bacterial fouling resistance of polypeptoid-modified surfaces: effect of side-chain chemistry,' *Soft Matter* (2008) 4, 131-139.

N.J. Brown, J. Johansson, **A.E. Barron**, 'Biomimicry of surfactant protein C,' *Acc. Chem. Res.* (2008) 41,1409-1417. (Review article)

R.J. Meagher, J.I. Won, J.A. Coyne, J. Lin, **A.E. Barron**, 'Sequencing of DNA by free-solution capillary electrophoresis using a genetically engineered protein polymer drag-tag,' *Anal. Chem.* (2008) 80, 2842-2848.

C.P. Fredlake, D.G. Hert, C.W. Kan, T.N. Chiesl, B.E. Root, R.E. Forster, **A.E. Barron**, 'Ultra-fast DNA sequencing on a microchip by a hybrid separation mechanism that gives 600 bases in 6.5 minutes,' *Proc. Natl. Acad. Sci. USA* (2008) 105, 476-481. PMCID: PMC2206561

N.P Chongsiriwatana, J.A. Patch, A.M. Czyzewski, M.T. Dohm, A. Ivankin, D. Gidalevitz, R.N. Zuckermann, **A.E. Barron**, 'Peptoids that mimic the structure, function, and mechanism of helical antimicrobial peptoids,' *Proc. Natl. Acad. Sci. USA* (2008) 105, 2794-2799. PMCID: PMC2268539

T.N. Chiesl, R.E. Forster, B.E. Root, M. Larkin, **A.E. Barron**, 'Stochastic single-molecule videomicroscopy methods to measure electrophoretic DNA migration modalities in polymer solutions above and below entanglement,' *Anal Chem* (2007) 79: 7740-7747.

L.S. Karfeld, S.R. Bull, N.E. Davis, T.J. Meade, **A.E. Barron**, 'Use of a genetically engineered protein for the design of a multivalent MRI contrast agent,' *Bioconjugate Chem.* (2007) 18: 1697-1700. PMCID: PMC2533256

A.M. Czyzewski, **A.E. Barron**, "Protein and peptide biomimicry: Gold-mining inspiration from Nature's ingenuity," *AIChE Journal* (2008) 54: 1-7. (Perspective/review article; w/cover image)

S.L. Seurynck-Servoss, N.J. Brown, M.T. Dohm, C.W. Wu, **A.E. Barron**, 'Lipid composition greatly affects the *in vitro* surface activity of lung surfactant protein mimics', *Colloids and Surfaces B: Biointerfaces* (2007) 57: 37-55.

R.J. Meagher, J.A. Coyne, C.N. Hestekin, T.N. Chiesl, R.D. Haynes, J.-I. Won, A.E. Barron, 'Multiplexed p53 mutation detection by free-solution bioconjugate microchannel electrophoresis with polyamide drag-tags,'*Analytical Chemistry* (2007) 79, 1848-1854.

E.D. Goluch, J.M. Nam, D.G. Georganopoulou, T.N. Chiesl, K.A. Shaikh, K.S. Ryu, A.E. Barron, C.A. Mirkin, C. Liu, "A bio-barcode assay for on-chip attomolar-sensitivity protein detection," *Lab on a Chip* (2006) 6, 1293-1299.

C.P. Fredlake, D.G. Hert, E.R. Mardis, A.E. Barron, 'What is the future of electrophoresis in large-scale genome sequencing?' *Electrophoresis* (2006) 27, 3689-3702. (Review)

C.N. Hestekin, A.E. Barron,'The potential of electrophoretic mobility shift assays for clinical mutation detection,' *Electrophoresis* (2006) 27, 3805-3815. (Review)

C.N. Hestekin, J.P. Jukupciak, T.N. Chiesl, C.W. Kan, C.D. O'Connell**, A.E. Barron**, 'An optimized microchip electrophoresis system for mutation detection by tandem SSCP and heteroduplex analysis for p53 gene exons 5-9,' *Electrophoresis* (2006) 27, 3823-3835.

S.L. Seurynck-Servoss, M.T. Dohm, A.E. Barron, "Effects of including an *N*-terminal insertion region and arginine-mimetic side chains in helical peptoid analogues of lung surfactant protein B", *Biochemistry* (2006) 45, 11809–11818.

T.N. Chiesl, K.W. Putz, M. Babu, P. Mathias, K.A. Shaikh, E.D. Goluch, C. Liu, **A.E. Barron**, 'Self-associating block copolymer networks for microchip electrophoresis provide enhanced DNA separation via "inchworm" chain dynamics,' *Analytical Chemistry* (2006) 78, 4409-4415.

R.J. Meagher, L.C. McCormick, R.D. Haynes, J.I. Won, J.S. Lin, G.W. Slater, **A.E. Barron**, 'Free-solution electrophoresis of DNA modified with drag-tags at both ends,' *Electrophoresis* (2006) 1702-1712.

K. Huang, C.W. Wu, T.J. Sanborn, J.A. Patch, K. Kirshenbaum, R.N. Zuckermann, **A.E. Barron**, I. Radhakrishnan, 'A threaded loop conformation adopted by a family of peptoid nonamers,' *J. Am. Chem. Soc.* (2005) 128, 1733-1738. PMCID: PMC2527689

Y. Endo, L. Zhang, R. Katashima, M. Itakura, E.A.S. Doherty, **A.E. Barron**, Y. Baba, 'Effect of polymer matrix and glycerol on rapid single-strand conformation polymorphism analysis by capillary and microchip electrophoresis for detection of mutations in the K-ras gene,' *Electrophoresis* (2005) 26, 3380-3386.

R.D. Haynes, R.J. Meagher, J.-I. Won, F.M. Bogdan, **A.E. Barron**, 'Comb-like, monodisperse polypeptoid drag-tags for DNA separations by end-labeled free-solution electrophoresis (ELFSE),' *Bioconjugate Chemistry* (2005) 16, 929-938.

K.A. Shaikh, K.S. Ryu, E.D. Goluch, J.M. Nam, J.W. Liu, S. Thaxton, T.N. Chiesl, **A.E. Barron**, Y. Lu, C.A. Mirkin, C. Liu, 'A modular microfluidic architecture for integrated biochemical analysis,' *Proc. Natl. Acad. Sci. U.S.A.* (2005) 102, 9745-9750. PMCID: PMC1161008

S.L. Seurynck, N.J. Brown, C.W. Wu, K.W. Germino, E.K. Kolmeir, E.P. Ingenito, M.R. Glucksberg, **A.E. Barron**, M. Johnson, 'Optical monitoring of bubble shape and size in a pulsating bubble surfactometer,' *Journal of Applied Physiology* (2005) 99, 624-633.

J.-I. Won, R.J. Meagher, **A.E. Barron**, 'Protein polymer drag-tags for DNA separations by End-Labeled Free-Solution Electrophoresis (ELFSE),' *Electrophoresis* (2005) 26, 2138-2148.

A.R. Statz, R.J. Meagher, **A.E. Barron**, P.B. Messersmith, 'New peptidomimetic polymers for antifouling surfaces,' *J. Am. Chem. Soc.* (2005) 127, 7972-7973. (Communication)

R.J. Meagher, J.I. Won, L.C. McCormick, S. Nedelcu, M. Bertrand, J.L. Bertram, G. Drouin, **A.E. Barron**, G.W. Slater, 'End-Labeled Free-Solution Electrophoresis (ELFSE) of DNA,' *Electrophoresis* (2005) 26, 331-350. (review)

S.L. Seurynck, J.A. Patch, **A.E. Barron**, 'Simple, helical peptoid analogues of lung surfactant protein B,' *Chemistry & Biology* (2005) 12, 77-88.

T.N. Chiesl, W. Shi, **A.E. Barron**, 'Poly(acrylamide-co-alkylacrylamides) for electrophoretic DNA purification in microchannels,' *Analytical Chemistry* (2005) 77, 772-779.

C.W. Kan, C.P. Fredlake, E.A.S. Doherty, **A.E. Barron**, 'DNA sequencing and genotyping in miniaturized electrophoresis systems,' *Electrophoresis* (2004) 25, 3564-3588. (review)

E.A.S. Doherty, C.W. Kan, B.M. Paegel, S.H.I. Yeung, S.T. Cao, R.A. Mathies, **A.E. Barron,** 'Sparsely crosslinked "nanogel" matrixes as fluid, mechanically stabilized polymer networks for high-throughput microchannel DNA sequencing,' *Analytical Chemistry* (2004) 76, 5249-5256.

J.-I. Won, R.J. Meagher, **A.E. Barron**, **'**Characterization of glutamine deamidation in a long, repetitive protein polymer *via* bioconjugate capillary electrophoresis,' *Biomacromolecules* (2004) 5, 1624-1624 **(Erratum).**

J.-I. Won, R.J. Meagher, **A.E. Barron**, **'**Characterization of glutamine deamidation in a long, repetitive protein polymer *via* bioconjugate capillary electrophoresis,' *Biomacromolecules* (2004) 5, 618-627.

C.W. Kan, E.A.S. Doherty, B.A. Buchholz, A.E. Barron, 'Thermoresponsive *N,N*-dialkylacrylamide copolymer blends as DNA sieving matrices with a thermally tunable mesh size,' *Electrophoresis* (2004) 25, 1007-1015.

R.J. Meagher, J. Seong, P.E. Laibinis, **A.E. Barron**, 'A very thin coating for capillary zone electrophoresis of proteins based on a tri(ethylene glycol)-terminated alkyltrichlorosilane,' *Electrophoresis* (2004) 25, 405-414.

B.A. Buchholz, J.M. Zahn, M. Kenward, G.W. Slater, **A.E. Barron**, 'Flow-induced chain scission as a physical route to narrowly distributed, high molar mass polymers,' *Polymer* (2004) 45, 1223-1234.

C.W. Kan, E.A.S. Doherty, **A.E. Barron,** 'A novel thermo-gelling polymer matrix for microchannel DNA sequencing', *Electrophoresis* (2003) 24, 4161-4169.

E.A.S. Doherty, C.W. Kan, A.E. Barron, 'Sparsely cross-linked "nanogels" for microchannel DNA sequencing,' Electrophoresis (2003) 24, 4170-4180.

C.W. Wu, K.Y.C. Lee, **A.E. Barron**, 'Helical peptoid mimics of lung surfactant protein C,' *Chemistry & Biology* (2003) 10, 1057-1063.

C.W. Wu, K. Kirshenbaum, T.J. Sanborn, J.A. Patch, K. Huang, K.A. Dill, R.N. Zuckermann, **A.E. Barron**, 'Structural and spectroscopic studies of peptoid oligomers with α-chiral, aliphatic side chains,' *J. Am. Chem. Soc.* (2003) 125, 13525-13530.

J.A. Patch, **A.E. Barron**. 'Helical peptoid mimics of magainin-2 amide,' *J. Am. Chem. Soc.* (2003) 125, 12092-12093. *(Communication)*

W.N. Vreeland, S.J. Williams, **A.E. Barron**, A.P. Sassi, 'Tandem isotachophoresis-zone electrophoresis via base-mediated destacking for increased detection sensitivity in microfluidic systems,' *Analytical Chemistry* (2003) 75, 3059-3065.

M.N.Albarghouthi, T.M. Stein, **A.E. Barron**, 'Poly-*N*-hydroxyethylacrylamide as a novel, adsorbed coating for protein separation by capillary electrophoresis,' *Electrophoresis* (2003) 24, 1166-1175.

I.V. Kourkine, M. Ristic-Petrovic, E. Davis, C. Ruffolo, **A.E. Barron**, 'Detection of *E. coli* O157:H7 by a combination of

immunofluorescent staining & capillary electrophoresis,' *Electrophoresis* (2003) 24, 655-661.
E.A.S. Doherty, R.J. Meagher, M.N. Albarghouthi, **A.E. Barron**, 'Microchannel wall coatings for protein separations,' *Electrophoresis* (2003) 24, 34-54. (review)
C.W. Kan, **A.E. Barron**, 'A DNA sieving matrix with a thermally tunable mesh size,' *Electrophoresis* (2003) 24, 55-62.
J.A. Patch, **A.E. Barron**. 'Mimicry of bioactive peptides by non-natural, sequence-specific peptidomimetic oligomers,' *Current Opinion in Chemical Biology* (2002) 6, 872-877. (review)
J.-I. Won, **A.E. Barron**, 'A new cloning method for the preparation of long, repetitive polypeptides without a sequence requirement,' *Macromolecules* (2002) 35, 8281-8287.
E.A.S. Doherty, K.D. Berglund, B.A. Buchholz, I.V. Kourkine, R.D. Tilton, **A.E. Barron**, 'Critical factors for high-performance physically adsorbed (dynamic) polymeric wall coatings for microchannel electrophoresis of DNA,' *Electrophoresis* (2002) 23, 2766-2776.
W.N. Vreeland, R.J. Meagher, **A.E. Barron**, 'Multiplexed, high-throughput genotyping by single-base extension and End-Labeled Free-Solution Electrophoresis (ELFSE),' *Anal. Chem.* (2002) 74, 4328-4333.
I.V. Kourkine, C.N. Hestekin, S.O. Magnusdottir, **A.E. Barron**, 'Optimized sample preparation methods for tandem capillary electrophoresis single-strand conformation polymorphism / heteroduplex analysis (CE-SSCP/HA),' *BioTechniques* (2002) 33, 318-325.
I.V. Kourkine, C.N. Hestekin, **A.E. Barron**, 'Technical challenges in applying Capillary Electrophoresis (CE) – Single-Strand Conformation Polymorphism (SSCP) for routine genetic analysis', *Electrophoresis* (2002) 23, 1375-1385. (review article)
B.A. Buchholz, W. Shi, **A.E. Barron**, 'Microchannel DNA sequencing matrices with switchable viscosities,' *Electrophoresis* (2002) 23, 1398-1409. (review including some primary data)
H. He, B.A. Buchholz, L. Kotler, A.W. Miller, **A.E. Barron**, B.L. Karger, 'DNA sequencing with hydrophilic and hydrophobic polymers at elevated column temperatures', *Electrophoresis* (2002) 23, 1421-1428.
M.N. Albarghouthi, B.A. Buchholz, P.J. Huiberts, T.M. Stein, **A.E. Barron**, 'Poly-*N*-hydroxyethyl acrylamide: A novel hydrophilic, self-coating polymer matrix for DNA sequencing by capillary electrophoresis,' *Electrophoresis* (2002) 23, 1429-1440.
V. Barbier, B.A. Buchholz, **A.E. Barron**, J.-L. Viovy, 'Comb-like co-polymers as self-coating low-viscosity and high-resolution matrices for DNA sequencing,' *Electrophoresis* (2002) 23, 1441-1449.
I.V. Kourkine, C.N. Hestekin, B.A. Buchholz, **A.E. Barron**, 'High-throughput, high-sensitivity genetic mutation detection by tandem single-strand conformation polymorphism (SSCP) / heteroduplex analysis (HA) capillary array electrophoresis (CAE)', *Anal. Chem.* (2002) 74, 2565-2572.
T.J. Sanborn, P.B. Messersmith, **A.E. Barron**. '*In situ* crosslinking of a biomimetic peptide-PEG hydrogel *via* thermally triggered activation of Factor XIII,' *Biomaterials* (2002) 23, 2703-2710.
W.N. Vreeland, G.W. Slater, **A.E. Barron**, 'Profiling solid-phase synthesis products by free-solution conjugate capillary electrophoresis,' *Bioconjugate Chem.* (2002) 13, 663-670.
W.N. Vreeland, **A.E. Barron**, 'Functional materials for microscale genomic and proteomic analyses,' *Current Opinion in Biotechnology* (2002) 13, 287-294. (review)
T.J. Sanborn, C.W. Wu, R.N. Zuckermann, **A.E. Barron**. 'Extreme stability of helices formed by water-soluble poly-*N*-substituted glycines (peptoids) with α-chiral side chains,' *Biopolymers* (2002) 63, 12-20.
B.A. Buchholz and **A.E. Barron**, 'The use of light scattering for precise characterization of polymers for DNA sequencing by capillary electrophoresis,' *Electrophoresis* (2001) 22, 4118-4128.
L. McCormick, G.W. Slater, A.E. Karger, W.N. Vreeland, **A.E. Barron**, C. Desruisseaux, G. Drouin, 'Capillary electrophoretic separation of uncharged polymers using polyelectrolyte engines: A theoretical model,' *J. Chrom. A* (2001) 924, 43-52.
C.W. Wu, T.J. Sanborn, R.N. Zuckermann, **A.E. Barron**, 'Peptoid oligomers with α-chiral, aromatic side chains. Sequence requirements for the formation of stable peptoid helices,' *J. Am. Chem. Soc.* (2001) 123, 6778-6784.
W.N. Vreeland, C. Desruisseaux, G. Drouin, G. Slater, **A.E. Barron**, 'Molar mass profiling of synthetic polymers by free-solution capillary electrophoresis of DNA-polymer conjugates,' *Anal.Chem.* (2001)73, 1795-1803.
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Book Chapters

N.P. Chongsiriwatana, **A.E. Barron**, 'Comparing bacterial membrane interactions of antimicrobial peptides and their mimics,' contributed book chapter in: **'Antimicrobial Peptides: Methods and Protocols'** (2009) Andrea C. Rinaldi, Editor, in press.
J.A. Coyne, J.S. Lin, **A.E. Barron**, "DNA sequencing and genotyping by free-solution conjugate electrophoresis', a chapter in the book "Capillary and Microchip Electrophoresis & Associated Microtechniques", 3rd Edition, J.S. Landers, Editor; 2008.
J.A. Patch, K. Kirshenbaum, S.L. Seurynck, R.N. Zuckermann, **A.E. Barron**, 'Versatile Oligo-(*N*-substituted) Glycines: The Many Roles of Peptoids in Drug Discovery,' *Pseudo-peptides in Drug Discovery,* P.E. Nielsen, ed. (2004) John Wiley & Sons Publishers, Hoboken, NJ. (book chapter)
C.W. Wu, **A.E. Barron**, 'Biomimetic Lung Surfactant Replacements,' *Biomimetic Materials and Design: Interactive Biointerfacial Strategies, Tissue Engineering and Drug Delivery*, A.K. Dillow and A. Lowman, Eds. (2002) Marcel-Dekker Publishers, New York, NY. (book chapter)

Extended Abstract

W.N. Vreeland, **A.E. Barron**, 'Free-solution capillary electrophoresis of polypeptoid-oligonucleotide conjugates,' *Polymer Preprints* (2000) 41, 1018-1019. (extended abstract with primary data)

Research Support – Annelise E. Barron

Development of a Biomimetic Lung Surfactant Replacement (Barron)
Funding Agency: NIH / National Heart, Lung, and Blood Institute
Grant # 2 R01 HL067984 (Barron—Contact PI/Sole PI)
Period of funding: 3/15/06 - 3/14/11
Develop synthetic protein mimics for a synthetic lung surfactant, to treat neonatal respiratory distress.

Ampetoids as Biostable Functional Mimics of Antimicrobial Peptides (Barron)
Funding Agency: NIH / National Institute of Allergy and Infectious Disease
Grant # 1 R01 AI072666 (Barron—Contact PI/Sole PI)
Period of funding: 3/15/07 - 2/28/12
Create, test, and study biostable, biomimimetic oligo-*N*-substituted glycine analogues of antimicrobial peptides.

First encounters of pathogens with the host: Fundamentals of pathogen recognition and killing (Haagsman)
Funding Agency: Human Frontiers Science Program
Grant # RGP0016/2009-C (Henk P. Haagsman, Contact PI, w/co-Investigator Annelise E. Barron)
Period of funding: 7/01/09-6/30/12
Study the mechanisms of "Innate Immune Effector Proteins" including surfactant protein D, which is known to bind and rapidly aggregate pathogens but otherwise is poorly understood, and host defense peptides such as LL-37.

A Universal Front End to Improve Assembly Outcomes for Next-Gen Sequencing and Re-Sequencing (Barron)
Funding Agency: NIH / National Human Genome Research Institute
1 RC2 HG005596-01 (Annelise Barron, Contact PI, w/co-I's Serafim Batzoglou, Eric Shaqfeh, and Stephen Quake)
Period of funding: 9/30/09 – 9/29/11
Collaborative project between Barron, Batzoglou, Shaqfeh, and Quake research groups. Develop a high-throughput, microfluidic "read-cloud" DNA sample preparation device to encapsulate and do ordered identification of DNA fragments ready for high-throughput sequencing projects, to develop computational sequence assembly methods.

Calvarial Regeneration using Biomatrix-Encapsulated Skeletal Progenitors (Longaker)
1 RC2 DE020771-01 (Michael Longaker, contact PI, w/Co-I's Irving Weissman and Annelise Barron)
Period of funding: 9/30/09 – 9/29/11
Funding Agency: NIH / National Institute of Dental and Craniofacial Research
Collaborative research project, Longaker, Weissman, and Barron groups. Isolate and characterize murine and human bone progenitor cells, and develop new microfluidic device technologies to encapsulate single progenitors in hydrogel microcapsules prior to fluorescence-activated, electrophoretic sorting. Sorted, encapsulated cells are transplanted into a murine model of a critical size calvarial defect, to allow the closure of large defects in bone. The Barron lab effort is specifically aimed at developing a microfluidic device for the on-line encapsulation of stem cells in optically clear, PEG-based microgel "capsules" that can protect stem cells during the process of sorting, and moreover, to develop a system for rapid electrophoretic sorting of these encapsulated cells.

OVERLAP of current support with present application: None.

Recently Completed Support:

Ultrafast DNA Sequencing on Microfluidic Chips: Matrices and Mechanisms (P.I. Annelise E. Barron)
Funding Agency: NIH / National Human Genome Research Institute
Grant # 2 R01 HG001970
Period of funding: 5/1/07 - 4/30/10
Create new polymer networks for ultra-fast, long-read DNA sequencing on microchips; study how they work.

Fast Mutation Detection by Tandem SSCP/HA on Microchips (P.I. Annelise E. Barron)
PI: **Annelise E. Barron**
Funding Agency: NIH / National Cancer Institute
Type: R21/R33 (R21 phase in Year 1, R33 phase in Years 2-4)
Grant # 1 R33 CA92752
Period of funding: 9/12/03 – 6/30/09
Pilot/test a micro-chip based screen for DNA sequence alterations in the p53 gene of clinical patient samples.

DNA Sequencing by End-Labeled Free-Solution Electrophoresis (ELFSE) on Microchips (P.I. Annelise E. Barron)
Funding Agency: NIH / National Human Genome Research Institute
Grant # 1 R01 HG002918
Period of funding: 7/15/03 - 7/14/07
Create novel protein-based "drag-tags" and develop a novel, bioconjugate method for long-read DNA sequencing in free solution (i.e., with no gel), to be carried out by microchannel electrophoresis on chips.

Catalytic Manipulation of Amide-Based Molecules and Materials (P.I. Samuel H. Gellman)
Funding Agency: National Science Foundation (Subcontract from University of Wisconsin-Madison)
Grant # L474530 // CHE-0404704
Period of funding: 9/1/04 – 8/31/09
Test a novel class of amide-based polymers (β-peptides from Gellman) as mimics of lung surfactant proteins.

Regenerative Scaffold Technologies for CNS and Diabetes (P.I. Samuel I. Stupp)
Funding Agency: NIH / National Institute of Biomedical Imaging and Bioengineering
Grant # 5 R01 EB003806
Period of funding: 9/4/04 – 8/31/09
Create protein-based hydrogels for *in vivo* sequestration/immune protection of β-islet, insulin-secreting cells.