

# EMILY PARKER

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## OBJECTIVE

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To contribute to the success of a biomedical device research and development team by utilizing my background in microsystems, bioengineering, and experimental research.

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## EDUCATION

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**University of California, Santa Barbara** **Sept. 2002 – present**

Ph.D. Candidate in Mechanical Engineering (Doctoral Scholar's Fellow)  
Emphasis in BioMicroElectroMechanical Systems (BioMEMS)  
Thesis Title: A Bulk Titanium Microsystem for Drug Delivery  
Research Advisor: Professor Noel C. MacDonald

**Stanford University** **Sept. 1997 – June 1998**

M.S. in Aeronautics and Astronautics

**University of Colorado, Boulder** **Aug. 1993 – May 1997**

B.S. in Aerospace Engineering, Minor in Japanese

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## PROFESSIONAL AND ACADEMIC EXPERIENCE

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**Research Assistant, University of California** **Sept. 2002 – present**

Titanium-based MEMS technology development for biomedical applications; bulk titanium micromachining, titanium surface modification techniques, and the design, fabrication, and characterization of in-plane bulk titanium microneedles for transdermal drug delivery.

**Research Engineer II, SRI International** **Jan. 2001 – Jan. 2003**

Member of a software development team for shuttle and orbital launch ground support systems. Responsibilities included algorithm development and testing, software component integration, and coordination of customer-related product approval, requirement verification, and training.

**Research Engineer I, SRI International** **Jan. 2000 – Jan. 2001**

Member of the range safety team responsible for launch support analysis. Specialized in the review and safety-related maintenance of the network communications subsystem.

**Graduate Student Intern, NASA Ames Research Center** **June 1998 – Sept. 1998**

Development and implementation of modernization solutions for a hypervelocity free flight testing facility.

**Research Assistant, University of Colorado** **May 1997 – Sept. 1997**

Development of fluid dynamic streamline algorithms for finite element modeling software.

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## HONORS AND AFFILIATIONS

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Doctoral Scholar's Fellowship, University of California (Sept. 2002 – June 2006)  
The Electrochemical Society Student Member (2004 – present)  
The American Physical Society Student Member (2004 – present)  
IEEE Student Member (2005 – present)  
ASME Student Member (2005 – present)

## TECHNICAL SKILLS

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### Microfabrication

Lithography  
ICP, RIE Dry Etching  
Wet Etching  
Thermal Oxidation  
Electron Beam Evaporation  
Sputter Deposition  
PECVD Deposition  
Thermal Compression Bonding  
Advanced Polymer Bonding  
Anodic Bonding

### Microscopy and Metrology

Scanning Electron Microscopy  
Fluorescence Microscopy  
Confocal Microscopy  
Focused Ion Beam  
Mechanical Profilometry  
Optical Profilometry  
Chemical Mechanical Polishing  
X-ray Reflectivity  
Small Angle X-ray Scattering  
Atomic Force Microscopy (AFM)  
Fluid Cell AFM

### Computing

MATLAB  
Mathematica  
C++  
LEdit  
FEMLAB  
SolidWorks  
Adobe Photoshop  
Adobe GoLive  
Windows and Mac OS

## PUBLICATIONS AND PROCEEDINGS

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**E. R. Parker**, M. P. Rao, K. L. Turner, C. D. Meinhart, and N. C. MacDonald, "A Bulk Titanium Microsystem for Drug Delivery," *in preparation*.

**E. R. Parker**, M. P. Rao, K. L. Turner, and N. C. MacDonald, "Bulk Titanium Microneedles with Embedded Microfluidic Networks for Transdermal Drug Delivery," *proceedings of the 19<sup>th</sup> IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2006)*, Istanbul, Turkey, 22-26 Jan. 2006.

**E. R. Parker**, B. J. Thibeault, M. F. Aimi, M. P. Rao, and N. C. MacDonald, "Inductively Coupled Plasma Etching of Bulk Titanium for MEMS Applications," *Journal of the Electrochemical Society*, **152** (10), 675-683 (2005).

**E. R. Parker**, L. S. Hirst, C. R. Safinya, and N. C. MacDonald, "Bulk Titanium Microfluidic Networks for Protein Self-Assembly Studies," *proceedings of the 9<sup>th</sup> International Conference of Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2005)*, Boston, MA, 9-13 Oct. 2005.

**E. R. Parker**, M. F. Aimi, B. J. Thibeault, M. P. Rao, and N. C. MacDonald, "High-Aspect-Ratio Inductively Coupled Plasma Etching of Bulk Titanium for MEMS Applications," *proceedings of the 206<sup>th</sup> Meeting of The Electrochemical Society (ECS)*, Honolulu, Hawaii, 3-8 Oct. 2004.

L. S. Hirst, **E. R. Parker**, Z. Abu Samah, Y. Li, N. C. MacDonald, and C. R. Safinya, "Microchannel Systems in Titanium and Silicon for Structural and Mechanical Studies of Aligned Protein Self-Assemblies," *Langmuir*, **21**, 3910-3914 (2005).

S. E. Boeshore, **E. R. Parker**, V. Lughì, and N. C. MacDonald, "Aluminum Nitride Thin Films on Titanium for Piezoelectric MEMS Applications," *proceedings of the IEEE International Ultrasonics Symposium*, Rotterdam, The Netherlands, 18-21 Sept. 2005.

Y. Zhang, **E. R. Parker**, M. P. Rao, M. F. Aimi, I. Mezic, and N. C. MacDonald, "Titanium bulk micromachining for BioMEMS: a DEP Device as a Demonstration," *proceedings of the ASME International Mechanical Engineering Congress*, Anaheim, CA, 13-19 Nov. 2004.

M. P. Rao, M. F. Aimi, **E. R. Parker**, and N. C. MacDonald, "Single-Mask, High Aspect Ratio, 3-D Micromachining of Bulk Titanium," *proceedings of the 18<sup>th</sup> IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2006)*, Miami, January 30 – February 3, 2005.

C. Ding, X. Huang, G. Gregori, **E. R. Parker**, M. P. Rao, D. R. Clarke, and N. C. MacDonald, "Development of Bulk Titanium Based MEMS RF Switch for Harsh Environment Applications," *proceedings of the 2005 ASME International Mechanical Engineering Congress and Exposition (IMECE 2005)*, Orlando, Florida, 5-11 Nov. 2005.

## PRESENTATIONS

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“Bulk Titanium Microneedles with Embedded Microfluidic Networks for Transdermal Drug Delivery,” presented at the 19<sup>th</sup> IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2006), Istanbul, Turkey, 22-26 Jan. 2006 (poster).

“Bulk Titanium Microfluidic Networks for Protein Self-Assembly Studies,” presented at the 9<sup>th</sup> International Conference of Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2005), Boston, MA, 9-13 Oct. 2005 (poster).

“High-Aspect-Ratio Inductively Coupled Plasma Etching of Bulk Titanium for MEMS Applications,” presented at the 206<sup>th</sup> Meeting of The Electrochemical Society (ECS), Honolulu, Hawaii, 3-8 Oct. 2004 (oral).

## PATENTS

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Provisional Patent Pending: “Bulk Titanium In-Plane Microneedles,” October 2005, University of California.

Provisional Patent Pending: “Monocyclic High Aspect Ratio Titanium Inductively Coupled Plasma Deep Etching Processes and Products so Produced,” October 2005, University of California.

## REFERENCES AVAILABLE UPON REQUEST

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