

**CAROLYN M. ENG**  
**CURRICULUM VITAE**

**PROFESSIONAL ADDRESS**

Department of Human Evolutionary Biology  
Harvard University  
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**EDUCATION**

<b>Institution</b>	<b>Degree</b>	<b>Year(s)</b>	<b>Field of study</b>
Harvard University Cambridge, MA	PhD	2007 – 2014	Ad Hoc degree program in Human Evolutionary Biology & Organismic and Evolutionary Biology
Duke University Durham, NC	BS	2001 – 2005	Major: Biological Anthropology and Anatomy Minors: Biology and Psychology

**PROFESSIONAL EXPERIENCE**

Muscle Physiology Staff Research Associate II

**Dr. Richard Lieber**

Departments of Orthopaedic Surgery and Bioengineering

Aug. 2005 – August 2007

University of California, San Diego and VA Medical Center, San Diego

Undergraduate Student

**Dr. Andrea Taylor**

Departments of Community and Family Medicine and Biological Anthropology and Anatomy

Aug. 2004 – May 2005

Duke University

Laboratory Assistant

**Dr. Elwood Linney**

Departments of Molecular Genetics and Microbiology

Sept. 2002 – May 2003

Duke University

**GRANTS & FELLOWSHIPS**

2013-2014 Wenner-Gren Dissertation Fieldwork Grant (Eng & Lieberman, “Exploring the function of the human iliotibial band and the implications for human locomotor economy”)

2013-2014 Harvard University Dissertation Completion Fellowship

2013-2014 Alan and Barbara Washkowitz Graduate Student Dissertation Fellowship

2013 Cora DuBois Fellowship

2012 Harvard University Graduate Student Council Conference Grant  
 2012-2014 Society for Integrative and Comparative Biology Charlotte Mangum Student Support Program Award  
 2012 Harvard Graduate School of Arts and Sciences Merit Fellowship  
 2009, 2011 Harvard Chapman Fellowship  
 2007-2009 Harvard Biomechanics IGERT Fellowship from the National Science Foundation  
 2005 Duke University Howard Hughes Research Fellowship  
 2005 Duke University Undergraduate Research Support Travel Grant  
 2004-2005 Sigma-Xi Grant-in-Aid of Research  
 2004 North Carolina Academy of Science Yarbrough Research Grant  
 2004 Duke University Undergraduate Research Support Grant

**HONORS & AWARDS**

<b>AWARD</b>	<b>YEAR(S)</b>	<b>INSTITUTION</b>
Dean's List with distinction	Fall 2003	Duke University
Dean's List	Fall 2001, Spring 2003 Fall 2004, Spring 2005	Duke University
Graduated Cum Laude	Spring 2005	Duke University
Derek Bok Distinction in Teaching Award-Life Sciences 2: Human Evolutionary Anatomy and Physiology	Fall 2011	Harvard University

**PEER-REVIEWED PUBLICATIONS**

**Eng CM**, Pancheri FQ, Lieberman DE, Biewener AA, Dorfmann L. Directional differences in the biaxial material properties of fascia lata and the implications for fascia function. *Annals of Biomedical Engineering* 2014; 42(6):1224-1237.

Pancheri FQ, **Eng CM**, Lieberman DE, Biewener AA, Dorfmann L. A constitutive description of the anisotropic response of the fascia lata. *Journal of the Mechanical Behavior of Biomedical Materials* 2014; 30: 306-323.

Mathewson MA, Kwan A, **Eng CM**, Lieber RL, Ward SR. Comparison of rotator cuff muscle architecture among humans and selected vertebrate species. *Journal of Experimental Biology* 2014; 217:261-273.

**Eng CM**, Lieberman DE, Zink KD, Peters MA. Bite force and occlusal stress production in hominin evolution. *American Journal of Physical Anthropology* 2013; 151: 544-557.

Ward SR, Sarver JJ, **Eng CM**, Kwan A, Wuergler-Hauri CC, Perry SM, Williams GR, Soslowsky LJ, Lieber RL. Plasticity of muscle architecture after acute supraspinatus tear. *Journal of Orthopaedic & Sports Physical Therapy* 2010; 40(11): 729-735.

**Eng CM**, Ward SR, Vinyard CJ, Taylor AB. The morphology of the masticatory apparatus facilitates muscle force production at wide jaw gapes in tree-gouging common marmosets (*Callithrix jacchus*). *Journal of Experimental Biology* 2009; 212: 4040-4055.

Taylor AB, **Eng CM**, Anapol F, Vinyard CJ. The functional correlates of jaw-muscle fiber architecture in tree-gouging and nongouging callitrichid monkeys. *American Journal of Physical Anthropology* 2009; 139(3): 353-367.

Ward S.R., **Eng CM**, Smallwood LR, Lieber RL. Are current measurements of lower extremity muscle architecture accurate? *Clinical Orthopaedics and Related Research* 2009; 467: 1074-1082.

Ward SR, Kim CW, **Eng CM**, Gottschalk LJ, Tomiya A, Garfin SR, Lieber RL. Architectural analysis and intraoperative measurements demonstrate the multifidus' unique design for lumbar spine stability. *Journal of Bone and Joint Surgery* 2009; 91: 176-185.

**Eng CM**, Smallwood LH, Rainiero MP, Lahey M, Ward SR, Lieber RL. Scaling of muscle architecture and fiber types in the rat hindlimb. *Journal of Experimental Biology*, 2008; 211: 2336-2345.

**Eng CM**, Abrams GD, Smallwood LH, Lieber RL, Ward SR. Muscle geometry affects accuracy of forearm volume determination by magnetic resonance imaging (MRI). *Journal of Biomechanics* 2007; 40: 3261-3266.

#### **BOOK CHAPTERS**

Taylor AB, Anapol FC, **Eng CM**, Vinyard CJ. The functional significance of jaw-muscle fiber architecture in tree-gouging callitrichids. In *The Smallest Anthropoids: The Marmoset/Callimico Radiation*. Davis LC, Ford SM, Porter LM (Eds.), New York: Springer, 2009.

Taylor AB, Anapol F, **Eng CM**, Vinyard CJ. The relationship between jaw-muscle fiber architecture and feeding behavior in primates: tree-gouging and nongouging gummivorous callitrichids as a natural experiment. In *Primate Craniofacial Function and Biology*. Vinyard CJ, Ravosa MJ, Wall CE (Eds.), New York: Springer, 2008.

#### **SYMPOSIA AND INVITED TALKS**

Muscle-tendon biomechanics symposium at the Society for Experimental Biology annual meeting in Valencia, Spain, July 2013.

Elastic mechanisms symposium at the World Congress of Biomechanics meeting in Boston, Massachusetts, July 2014.

#### **ABSTRACTS AND PROCEEDINGS**

Eng CM, Arnold AS, Lieberman DE, Biewener AA, Dorfmann A. Length changes in the human iliotibial band in relation to hip and knee motion. *Society for Integrative and Comparative Biology*, 2014.

Eng CM, Pancheri FQ, Lieberman DE, Biewener AA. Directional differences in the biaxial material properties of goat fascia lata. *American Society of Biomechanics*, 2013.

Eng CM, Pancheri FQ, Lieberman DE, Biewener AA, Dorfmann A. Pulling in two directions: biaxial materials properties of fascia lata. *Society for Integrative and Comparative Biology*, 2013.

Eng CM, Lieberman DE, Biewener AA. Swing phase energy storage in the goat fascia lata has implications for the function of the human iliotibial band. *American Association of Physical Anthropologists*, 2012.

Eng CM, Lieberman DE, Biewener AA. In vivo strain patterns indicate different functions in the proximal and distal fascia lata of the goat. *Society for Integrative and Comparative Biology*, 2012.

Eng CM, Higham TE, Biewener AA. Muscle fiber length operating ranges reflect disparate functions between muscles. *Society for Integrative and Comparative Biology*, 2009.

Eng CM, Peters MA, Duncan K, Lieberman DE. Bite force scaling and food mechanical properties. *American Association of Physical Anthropologists*, 2009.

Eng CM, Ward SR, Winters TM, Kingsbury TD, Vinyard CJ, Taylor AB. Mechanics of the masticatory apparatus favor muscle force production at wide jaw gapes in tree-gouging marmosets. *American Association of Physical Anthropologists*, 2007.

Eng CM, Ward SR, Sarver JJ, McElroy C, Perris SM, Williams GR, Soslowsky LJ, Lieber RL. Architectural plasticity in the rat supraspinatus muscle in response to acute tendon tear. *Division of Vertebrate Morphology of the Society of Integrative and Comparative Biology*, 2007.

Eng CM, Smallwood LH, Rainero MP, Lahey ML, Ward SR, Lieber RL. Complete muscle architecture of the rat hindlimb. *Med Sci Sport and Exercise* 38(5) S267, 2006.

Eng CM, Ward SR, Smallwood LH, Abrams GD, Lieber RL. Forearm muscle volumes can be accurately obtained from high resolution MRI. *World Congress on Biomechanics*, 2006.

Eng CM, Vinyard CJ, Anapol F, Taylor AB. Stretching the limits: Jaw-muscle fiber architecture in tree-gouging and nongouging callitrichid monkeys. *American Association of Physical Anthropologists*, 2005.

#### **SCIENTIFIC PRESENTATIONS**

Length changes of the human iliotibial band with motions of the hip and knee. Society for Integrative and Comparative Biology (SICB) annual meeting, Austin, TX, January 2014.

Directional differences in the biaxial material properties of goat fascia lata. American Society of Biomechanics annual meeting, Omaha, NE, September 2013.

Pulling in two directions: Biaxial material properties of goat fascia lata. SICB annual meeting, San Francisco, CA, January 2013.

Swing phase energy storage in the goat fascia lata has implications for the function of the human iliotibial band. American Association of Physical Anthropologists (AAPA) annual meeting, Portland, OR. April 2012.

In vivo strain patterns indicate different functions in the proximal and distal fascia lata of the goat. SICB annual meeting, Charleston, SC. January 2012.

Bite force scaling and food mechanical properties. AAPA annual meeting, Chicago, IL. April 2009.

Muscle fiber length operating ranges reflect disparate functions between muscles. SICB annual meeting, Boston, MA. January 2009.

Mechanics of the masticatory apparatus favor muscle force production at wide jaw gapes in tree-gouging marmosets. AAPA annual meeting, Philadelphia, PA. April 2007.

Complete Muscle Architecture of the Rat Hindlimb. American College of Sports Medicine annual meeting, Denver, CO. June 2006.

Forearm muscle volumes can be accurately obtained from high resolution MRI. University of California, San Diego Orthopaedic Surgery Seminar, San Diego, CA. November 2006.

Stretching the limits: Jaw-muscle fiber architecture in tree-gouging and nongouging callitrichid monkeys. AAPA annual meeting, Milwaukee, WI. April 2005.

A comparative analysis of temporalis fiber architecture in tree-gouging (*Callithrix jacchus*) and nongouging (*Saguinus oedipus*) callitrichids. Visible Thinking: A Presentation of Undergraduate Research at Duke University, Durham, NC. April 2005.

A comparative analysis of temporalis fiber architecture in tree-gouging (*Callithrix jacchus*) and nongouging (*Saguinus oedipus*) callitrichids. Howard Hughes poster session, Durham, NC. April 2005.

**PROFESSIONAL ACTIVITIES AND MEMBERSHIPS**

- 1) Society for Experimental Biology (Member: 2013-)
- 2) American Association of Anatomists (Member: 2012-)
- 3) Harvard Graduate Women in Science Mentoring Program (Co-chair: 2010-2012)
- 4) American Society of Biomechanists (Member: 2008-present)
- 5) Association for Women in Science (Member: 2008-present)
- 6) Harvard Graduate Women in Science and Engineering (Department Representative: 2008-2013; Executive board: 2012)
- 7) American Association of Physical Anthropologists (Member: 2008-present)
- 8) Society for Integrative and Comparative Biologists (Member: 2008-present)
- 9) Harvard Graduate Student Council (Department Representative: 2008-2009)

**COMMUNITY SERVICE ACTIVITIES**

- 1) Kids at Heart Tutoring (San Diego, CA; 2005-2007)
- 2) Science Club for Girls (Boston, MA; 2008-2013)

**REFERENCES**

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Andrea B. Taylor, PhD	Duke University Medical Center Box 3907 Durham, NC 27710 (919) 668-3016 <a href="mailto:andrea.taylor@duke.edu">andrea.taylor@duke.edu</a>
Samuel R. Ward, PT, PhD	University of California San Diego 9500 Gilman Drive, Mail code 9151 La Jolla, CA 92093 (858) 534-4918 <a href="mailto:srward@ucsd.edu">srward@ucsd.edu</a>