

## CURRICULUM VITAE

April 9, 2014

Maria-Grazia Ascenzi, PhD

Department of Orthopaedic Surgery  
University of California at Los Angeles  
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### EDUCATION

1979 Laurea in Matematica, Università di Roma La Sapienza, *110 et laude*  
1983 M.A. Mathematics, Brandeis University  
1985 Ph.D. Mathematics, Brandeis University

### PROFESSIONAL ACTIVITIES AND ACADEMIC APPOINTMENTS

2011-current Research Professor (Step I), UCLA School of Medicine,  
Dept. Orthopedic Surgery, Biomechanics Research Division  
2004-current Research Scientist in Medicine, US Department of Veterans Affairs,  
VA Greater Los Angeles  
2005-2011 Research Associate Professor, UCLA School of Medicine,  
Dept. Orthopedic Surgery, Biomechanics Research Division  
2003-2005 Research Assistant Professor, UCLA School of Medicine,  
Dept. of Orthopedic Surgery, Biomechanics Research Division  
2000-2003 Visiting Assistant Professor, UCLA School of Medicine,  
Dept. Orthopedic Surgery, Biomechanics Research Division  
1993-2000 Mathematical consultant for bone with resident training in bone micro-structural  
techniques, *Università di Roma La Sapienza*, School of Medicine,  
Dept. Experimental Medicine and Pathology  
1992-2000 Math Instructor, UCLA Extension and Mount Saint Mary's and Cypress Colleges  
1990-1992 Assistant Professor, Mount Saint Mary's College,  
Dept. of Physical Sciences and Mathematics  
1985-1988 Assistant Professor, City University of New York at Brooklyn College,  
Dept. of Mathematics  
1981-1985 Interpreter of mathematical aspects of bioengineering papers, Massachusetts  
Institute of Technology, Dept. of Brain Science  
1978-1980 *Ricercatore Confermato*, *Università di Roma La Sapienza*, Dept. of Mathematics

### HONORS, AWARDS AND LECTURESHIPS

International honors, awards and lectureships

1979-1983 Fulbright-Hayes grant to partially support graduate studies in the USA  
2009 NIRA ORS Award for "Primary cilia are highly oriented with respect to collagen  
direction and long axis of extensor tendon" by Eve Donnelly, Maria-Grazia  
Ascenzi, Cornelia Farnum, 55th annual meeting Orthopaedic Research Society,  
Las Vegas, Nevada  
2009 Invited speaker, 3rd Colloquium on Computational Mechanics for Young  
Scientists from Academia and Industry, *Leibniz Universität Hannover*, Hannover,  
Germany, September 21-23  
2010 Invited speaker and chairperson of session, 16th US National Congress of  
Theoretical and Applied Mechanics, State College, Pennsylvania  
2012-current Member, Nominating Committee, Orthopaedic Research Society  
2012-current Member, Ethics Advisory Committee, American Society of Bone and Mineral

Research  
2013 Invited speaker, 19th Congress of the European Society of Biomechanics,  
Patras, Greece  
2013-current Member, Editorial Board, Bone  
2014-current Consulting Editor, Journal of Biomechanics

National honors, awards and lectureships

1978-1979 Consiglio Nazionale delle Ricerche, scholarship for research in Mathematics,  
*Università di Roma La Sapienza*, Dept. of Mathematics  
1975-1978 *Ente Nazionale per Assistenza Sanitaria* (Italy), awards for academic excellence

Local honors, awards and lectureships

1986-1987 Research Foundation of the City University of New York, scholarship for research  
in Mathematics, Brooklyn College

SPECIAL APPOINTMENTS

2008-current Chief Scientist, Micro-Generated Algorithms, LLC  
2004-2009 Educational Preceptor, Bone Micro-structure and Bone Quality, Procter &  
Gamble

MEMBERSHIPS

1985-current American Association of Mathematics  
1998, 2013 European Society of Biomechanics  
2003-current American Society of Bone and Mineral Research, current member of the Ethics  
Advisory Committee  
2003-current International Society of Biomechanics  
2006-current Math Science Interchange  
2006-current Orthopaedic Research Society, current member of the Membership Committee  
2010-current Italian Scientists and Scholars in North America Foundation  
2012-current International Society of Bone Morphometry

EDITORIAL SERVICE

1998-current Reviewer, Journal of Biomechanics  
2004-current Reviewer, The Anatomical Record  
2004-current Reviewer, Archives of Gerontology and Geriatrics  
2005-current Reviewer, Annals of Biomedical Engineering  
2006-current Reviewer, Connective Tissue Research  
2006-current Reviewer, Journal of Biomechanical Engineering  
2006-current Reviewer, Journal of Orthopaedic Research  
2007-current Reviewer, International Journal of Damage Mechanics  
2007-current Reviewer, Journal of Materials Science  
2007-current Reviewer, Material Science and Engineering  
2009-current Reviewer, Bone  
2011-current Reviewer, Cell and Tissue Research  
2011-current Reviewer, Cilia  
2011-current Reviewer, Osteoporosis International  
2011-current Reviewer, Journal of Anatomy  
2011-current Reviewer, e Cells & Materials  
2011 Guest Editor, Journal of Biomechanics  
2013-current Reviewer, PLoS One  
2013-current Member, Editorial Board, Bone  
2014-current Consulting Editor, Journal of Biomechanics

### GRANT REVIEW SERVICE

2011 National Science Foundation panelist for grant proposal review

### INTERNATIONAL COMMITTEES

2003 *Università di Roma La Sapienza*, Dept. of Mathematics, *Tesi di Laurea* Committee  
2010 Chairperson of Organizing Committee of Workshop “Bone Tissue: Hierarchical Simulations for Clinical Applications”, UCLA, April 19-23

### COMMUNITY SERVICE

1993 Lecturer on teaching of mathematics, public school teacher continuing education, University of San Diego Extension  
2000-current Mentor to UCLA’s Volunteers, usually graduates from foreign universities and spouses of UCLA’s students or faculty  
2007-current Certified Advanced referee for American Youth Soccer Organization. We mentor adolescents, including minorities from South Central Los Angeles to teach them the joy of a sport, respect and discipline  
2009-current Member, Math Science Interchange, Los Angeles chapter. This organization develops programs to encourage underprivileged minority girls in middle and high school to consider careers in Mathematics and Science  
2009 Reviewer abstracts for annual meeting, Orthopaedic Research Society  
2012-current Leader and Organizer of Research Interest Group, Bone Tissue: Hierarchical Simulations for Clinical Applications, Annual meeting of Orthopaedic Research Society.  
2012-current Leader, poster tour, annual meeting Orthopaedic Research Society.  
2013-2014 Member, Nominating Committee, Orthopaedic Research Society.  
2013-current Member, Ethics Advisory Committee, American Society of Bone and Mineral Research

### RESEARCH ACTIVITIES

The focus of my research is the determination of the factors that reduce the bone quality and increase the risk of fracture. Specifically, I study the effect of age, sex, clinical and environmental factors on bone structure. Because bone fracture is caused by the alteration of the micro-structural environment, my specialty is the investigation of bone micro-structure and of the patterns that the micro-structure forms in the whole bone. My major interest is the orientation of collagen type I, a determinant of bone strength, which is independent of calcification, in health and disease. I am a promoter of bone interdisciplinary research across Clinical, Biology, Engineering, Physics, Mathematics disciplines.

I investigate the effect of altered bone metabolism (osteoporosis, osteoarthritis, hypoparathyroidism, hyperparathyroidism; diabetes), of orthopaedic surgery (spinal fusion, hip arthroplasty), and the effect of medications (bone anabolic, bone anti-resorptive and cholesterol reducing). The human specimens are obtained from orthopaedic surgery, iliac crest biopsy, and from donors. The animal models include rabbit, rat, genetically mutated and transgenic mouse.

I investigate bone’s cancellous and cortical components and growth plate’s cellular and extracellular matrix components. I am proficient in

- unique and validated experimental methods for micro-specimen isolation;
- transmission and scanning electron microscopy, scanning confocal microscopy, circularly polarized light microscopy, high resolution (1-2 $\mu$ m) micro-X-ray, micro-mechanical testing, micro and regular computed tomography; and
- robust morphometric methods to collect data from experimentally obtained images.

I apply

- engineering methods (e.g. finite element simulations of mechanical testing of bone to explain the effect of bone's elementary components on mechanical behavior and bone strength); and
- mathematical methods (algebraic geometry, analysis, geometry, three-dimensional reconstruction, statistics) to experimental data to uncover and analyze patterns.

My research has produced a portfolio of granted patents

2001 #7,124,067, System and method for modeling bone structure  
2002 #7,127,383, Modeling viscoelastic torsional properties of osteons  
2003 #7,283,940, Multidirectional morphology and mechanics of osteonic lamellae  
2004 #7,353,153, Method and system for modeling bone structure  
2005 #7,212,958, Method and system for modeling bone structure  
2006 #8,082,135, Method and system for modeling bone structure

and pending patents

#60/708,987: Cellular function underlying bone micro-structure characteristic of type 2 diabetes  
#20080119719: Template for assessing bone quality and methods of use thereof

#### GRANTS and FUNDING

2012 UCLA's Center for Translational Technologies Core Voucher Grant, Suzie Krum-Miranda, PI

2011-2012 Collaborator of NIH R21 grant, Linda Demer and Yin Tintut, PI's

2010-current NSF's XSEDE and TeraGrid BCS100001 (TRAC). Supercomputer time. PI Ascenzi. Simulations of micro- and meso- scale structures of human bone. Images of models included in Annual Report of San Diego Super Computing.

2011 Burroughs Wellcome Fund, Collaborative Research Travel Grant to participate in the 5th Annual Workshop on "Finite Element Modeling in Biology", June 5 -11, 2011 at the University of Massachusetts, Amherst.

2010 Support of workshop "Bone Tissue: Hierarchical Simulations for Clinical Applications", April 21-23, at UCLA co-organized by UCLA's Orthopaedic Hospital/Department of Orthopaedic Surgery and Institute of Pure and Applied Mathematics.

- Amgen Inc #MED-17435, PI Ascenzi
- Lilly USA Co #100205301, PI Ascenzi
- Medtronic Inc, PI Ascenzi
- Musculoskeletal Transplant Foundation, PI Ascenzi
- National Science Foundation #20093989, PI Ascenzi
- Simulia, PI Ascenzi
- Nature, PI Ascenzi
- Springer, PI Ascenzi

2009 NSF's TeraGrid DMS080029 (Supplemental resource to complete the work described in TG-DMS080008N and TG-DMS080027T).

2008 NSF's TeraGrid DMS080029 (New - DAC-TG). Supercomputer time. PI Ascenzi. The distribution of collagen-apatite orientation in bone microstructures.

2008 NSF's TeraGrid DMS080006 (New - DAC-TG). Supercomputer time. PI Ascenzi. Biomechanics of human bone microstructures (Submitted on Dec 13, 2007).

2003-2008 Procter & Gamble, PI Ascenzi, Co-Investigator Aurelia Nattiv, Normal and osteoporotic changes of femoral trabeculae by site and age

2007 NSF's TeraGrid MSS020007 (Renewal - DAC-SDSC). Supercomputer time. PI Ascenzi. Virtual bone modeling for bone quality assessment

2006-2007 2006	Procter & Gamble, PI Ascenzi, Osteoporotic manifestations of type 2 diabetes NSF's TeraGrid MSS020007 (Renewal - DAC-SDSC). Supercomputer time. PI Ascenzi. Co-PI Virtual bone modeling for bone quality assessment
2005-2006	The Stein Oppenheimer Endowment Fund Awards for the Health Sciences at UCLA, PI Ascenzi, Co-PI Dean Yamaguchi, Type 2 diabetes mesenchymal function yielding bone quality alteration
2005	NSF's TeraGrid MSS020007 (Renewal - DAC-SDSC). Supercomputer time. PI Ascenzi. Cyclic torsional loading of human bone microstructure
2004-2007	Procter & Gamble, PI Ascenzi, Estimation of trabecular structure quality in patients' femoral head with femoral neck fracture
2002-2004	NSF's TeraGrid MSS020007 (New - DAC-SDSC). Supercomputer time. PI Ascenzi. Torsional cyclic loading of osteons.
2000-2002	National Science Foundation, PI Ascenzi, Torsional cyclic loading of single osteons

#### IN PREPARATION AND PENDING GRANTS, AND FUNDING

2014	Amgen, Maria-Grazia Ascenzi (PI), preclinical research
2014	Amgen, Maria-Grazia Ascenzi (PI), clinical research
2014	PI of NIH RO1 grant with Fabrizio Billi and Susie Krum
2013-current	Development of relations with medical imaging and pharmaceutical companies towards translation of patent portfolio in clinical and dental commercial applications

#### FELLOWSHIP Administrator

2003-current	Student Research Program, UCLA (eight to ten students per year)
2004-current	Short Term Training Program, School of Medicine, UCLA (four students)
2010	UC LEADS - Summer Program (one student)
2010, 2012	NSF Research Experience for Undergraduates - Summer Program (eight students)
2012	Stage de Fin d'Etudes of Bioengineering Master candidate in Dr. Ascenzi laboratory from Grande Ecole I.S.I.F.C. Génie Biomedical, Bésançon, France (one student)

#### PUBLICATIONS

##### Peer-Reviewed Research Papers

##### Published

1. **Ascenzi M-G** (1986) The restricted tangent bundle to a curve in  $P^3$  Proceedings of American Mathematical Society, 98, 561-572.
2. Amiconi G, Ascenzi P, **Ascenzi M-G** (1987) Enzyme competitive inhibition Graphical determination of  $K_i$  and presentation of data in comparable studies Biochemical Education, 15, 134-139.
3. **Ascenzi M-G** (1988) The tangent bundle restricted to a curve in  $P^2$  Communications in Algebra, 16, 2193-2199.
4. Ascenzi A, **Ascenzi M-G**, Benvenuti A, Mango F (1997) Pinching in longitudinal and alternate osteons during cyclic loading Journal of Biomechanics, 30, 676-689.
5. **Ascenzi M-G** (1998) A first estimate of prestress in so-called circularly fibered osteonic lamellae Abstracts of the 11th conference of the European Society of Biomechanics Journal of Biomechanics, 31, Suppl.1, 22.
6. **Ascenzi M-G** (1999) A first estimation of prestress in so-called circularly fibered osteonic lamellae J Biomechanics, 32, 935-942.
7. **Ascenzi M-G**, Ascenzi A, Burghammer M, Panzavolta S, Benvenuti A, Bigi A (2003)

Structural differences between “dark” and “bright” isolated human osteonic lamellae *Journal of Structural Biology*, 141, 22-33.

8. **Ascenzi M-G**, Andreuzzi M, Kabo J M (2004) Mathematical modeling of secondary osteons *Scanning* 26, 25-35.
9. **Ascenzi M-G**, Lomovtsev A (2006) Collagen orientation patterns in human secondary osteons, quantified in the radial direction by confocal microscopy *Journal of Structural Biology* 153, 14-30.
10. **Ascenzi M-G**, Lenox M, Farnum C (2007) Analysis of the orientation of primary cilia in growth plate cartilage: a mathematical method based on multiphoton microscopical images *Journal of Structural Biology* 158, 293-306.
11. **Ascenzi M-G**, Dicomite M, Mitov P, Kabo J M (2007) Hysteretic pinching of human secondary osteon under torsion *Journal of Biomechanics*, 40, 2619-2627.
12. **Ascenzi M-G**, Gill J, Lomovtsev A (2008) Collagen orientation patterns around osteocyte lacunae in human secondary osteons by confocal microscopy *Journal of Biomechanics* 41, 3428-3437.
13. Donnelly E, **Ascenzi M-G**, Farnum C E (2010) Primary cilia are highly oriented with respect to collagen direction and long axis of extensor tendon *Journal of Orthopaedic Research* 28, 77-82.
14. Bimonte S, De Angelis A, Quagliata L, Giusti F, Tammaro R, Dallai R, **Ascenzi M-G**, Diez-Roux G, Franco B (2010) *Odf1* is required in limb bud patterning and endochondral bone development *Developmental Biology* 349, 179-191.
15. **Ascenzi M-G**, Hetzer N, Lomovtsev A, Rude R, Nattiv A, Favia A (2011) Variation of trabecular architecture in proximal femur of postmenopausal women *Journal of Biomechanics* 44, 248-256.
16. Sage A P, Lu J, Atti E, Tetradis S, **Ascenzi M-G**, Adams D J, Demer L L, Tintut Y (2011) Hyperlipidemia induces resistance to PTH bone anabolism in mice via oxidized lipids *Journal of Bone and Mineral Research*, 26, 1197-1206.
17. **Ascenzi M-G**, Blanco C, Drayer I, Kim H, Wilson R, Retting K, Lyons K, Mohler G (2011) Effect of localization, length and orientation of chondrocytic primary cilium on murine growth plate organization *Journal of Theoretical Biology*, 285, 147-155.
18. Pirih F, Lu J, Fei Y, Bezouglaia O, Atti E, **Ascenzi M-G**, Tetradis S, Demer L L, Aghaloo T, Tintut Y (2011) Adverse effects of hyperlipidemia on bone regeneration and strength *Journal of Bone and Mineral Research* 27, 309-318.
19. **Ascenzi M-G**, Liao V P, Lee B M, Billi F, Zhou H, Lindsay R, Cosman F, Nieves J, Bilezikian J P, Dempster D W (2012) Parathyroid hormone treatment improves cortical bone microstructure by improving collagen type I in postmenopausal women with osteoporosis *Journal of Bone and Mineral Research* 27, 702-712 *Ascenzi image on cover of March issue.*
20. **Ascenzi M-G**, Kawas N, Lutz A, Kardas D, Nackenhorst U, Keyak J (2013) Individual-specific, multi-scale finite element simulation of the proximal femur cortex *Journal of Computational Physics Special Issue on Multi-scale Modeling Guest Editor Ching-Long Lin*, 244, 298-311.
21. **Ascenzi M-G**, Lutz A, Lutz A, Du X, Klimecky L, Kawas N, Hourany T, Jahng J, Chin J, Tintut Y, Nackenhorst U, Keyak J (2013) Identification and quantification of genetic and environmental effects on multiscale structure and strength of murine femur (*Journal of Biomechanics*, accepted).

Submitted

22. **Ascenzi M-G**, Du X, Harding J I, Beylerian E N, de Silva B M, Gross B J, Kastein H K, Wang W, Lyons K M, Schaeffer H (2013). Automated detection and morphometry of chondrocytes in the murine growth plate (*IEEE Transactions on Medical Imaging*).

In preparation

1. Billi F, **Ascenzi M-G**, Krum-Miranda S, Adams J S, Benya P (2014) Novel three-dimensional scaffold for bone generation.
2. D'Angelo A, **Ascenzi M-G**, Franco B (2014) The length of the primary cilium plays a biological role in the mouse brain (to be submitted to Development).
3. **Ascenzi M-G**, Mac A, Lomovtsev A, Rude R, Nattiv A, Favia A (2014) A microstructurally meaningful template for BMD assessment at the human distal femur (to be submitted to Journal of Biomechanics).
4. **Ascenzi M-G**, Chin J, Recker R (2014) The orientation of collagen type I as a factor of reduced bone quality as a cause of fractures.

#### Research Papers (Non Peer-Reviewed)

1. **Ascenzi M-G** (2009) Applied mathematician uses Maple to simulate the biomechanics of human bone microstructure Published online at Maplesoft website <http://www.maplesoft.com/company/publications/articles>.
2. **Ascenzi M-G**, Roe A K (2011) The osteon: the micromechanical unit of compact bone Front Biosci 2012 Jan 1;17:1551-81.

#### Book Chapters

##### Published

1. **Ascenzi M-G**, Benvenuti A, Ascenzi A (2000) Single osteon micromechanical testing In: Mechanical Testing of Bone (An Y, Draughn R Eds.) pp 271-290, CRC Press, Boca Raton, Florida.

##### Editorials

1. **Ascenzi M-G** (2001) Antonio Ascenzi (1915-2000) Journal of Biomechanics, 34, 4.
2. **Ascenzi M-G** (2001) Antonio Ascenzi (1915-2000) Calcified Tissue International, 68, 2.
3. **Ascenzi M-G**, Reilly, GC (2011) Bone tissue: Hierarchical simulations for clinical applications. Journal of Biomechanics 44, 211-212 Epub 2010 Nov 3

##### My research is mentioned in

1. XSEDE, eXtreme Science and Engineering Discovery Environment, Annual Report including Q2 2012 Report (April 1, 2012, through June 30, 2012).
2. UCLA Ortho Bulletin 2012.

##### Published Abstracts

1. **Ascenzi M-G**, Benvenuti S, Ascenzi A (1997) Pinching in longitudinal and alternate osteons during cyclic loading, Abstracts of the 4th International Conference in Composites Engineering, Hawaii.
2. **Ascenzi M-G** (1998) A first estimate of prestress in so-called circularly fibered osteonic lamellae, Abstracts of the 11th conference European Society of Biomechanics, Toulouse, France.
3. **Ascenzi M-G** (1999) Evidence of macroscopic prestress in human femoral shaft, Abstracts of the XVIIth conference of the International Society of Biomechanics, Calgary.
4. Mango F, **Ascenzi M-G**, Aschero G, Battaglia S, Benvenuti A, Gizdulioh P (2001) Microwave apparatus to study the mechanical behavior of solid samples subjected to external stresses, Proceedings of the International Society for Optical Engineering Third International Conference on Experimental Mechanics, 4537, 99-102.
5. **Ascenzi M-G**, Andreuzzi M, Kabo J M (2003) Mathematical modeling of human compact bone microstructures Proceedings of Modern Microscopy/Scanning 2003, San Diego, California 25, 2, 89.
6. **Ascenzi M-G**, Lomovtsev A (2004) Distribution of collagen bundle orientation in human secondary osteons, Proceedings of Modern Microscopy/Scanning 2004, Washington DC,

26, 2, 90-91.

7. Farnum C, Tinsley M L, **Ascenzi M-G** (2006) Methodology to assess the primary cilium of chondrocytes, *Matrix Biology* 25, S14.
8. Hetzer N, Favia A, Rude R, Nattiv A, Lomovtsev A, **Ascenzi M-G** (2007) Novel quantification of trabecular density and trabecular thickness in the proximal femur of postmenopausal women, *Journal of Investigative Medicine* 55, S80-S80.
9. **Ascenzi M-G** (2008) Mechanical implications of collagen-apatite orientation in human secondary osteons, *Cells Tissues Organs - Chemistry and Biology of Mineralized Tissues*, 189, 88.
10. **Ascenzi M-G**, Hetzer N, Mac A, Lomovtsev A, Rude R, Nattiv A (2008) New link between trabecular properties and t-score at the human femur *Journal of Bone and Mineral Research* 23, S312-S312.
11. Differences in cortical micro-structure between hypo- and hyper- parathyroidism in women, Abstracts of the 12th meeting of the International Society of Bone Morphometry, 2012, Minneapolis, Minnesota.
12. Two advancements in micro-structural variation within the macro-structure of human bone, Abstracts of the German Association for Computational Mechanics, Section on Computational Bone Mechanics, 3rd Colloquium on Computational Mechanics for Young Scientists from Academia and Industry, Leibniz Universität Hannover, in Hannover, Germany, September 21-23, 2009.

#### TEACHING

- 1990-current Occasional tutoring at elementary, middle, high school levels including young actors through On Location Education.
- 1994-current Lectures on Resolving Math Anxiety, and on Effective Learning of Mathematics, to public school teachers and to Middle and High school underprivileged girls.
- 1980-2000 College-level mathematics, physics, statistics, business mathematics. (including Math Instructor at UCLA Extension, Mount Saint Mary's and Cypress Colleges, Northeastern University and Brandeis University; Assistant Professor at Mount Saint Mary's College, Dept. of Physical Sciences and Mathematics; Assistant Professor at City University of New York at Brooklyn College, Dept. of Mathematics)
- 2000-current Bone biomechanics, research methodology, experimental design and techniques for preparation of bone micro-specimens, morphometry, micro-mechanical testing, data collection, data analysis, and modeling of micro-structures by finite element analysis to undergraduates (Lower and Upper division research for undergraduates, UC Leads summer program, NSF Research Experience for Undergraduates summer program) and medical students (Short Term Training Program during first and last years of medical school). Approximately 65% of the undergraduate alumni of the laboratory, of which 50% belong to underrepresented minorities, have continued into medical school.

#### MENTORSHIP

- |                    |                          |                       |
|--------------------|--------------------------|-----------------------|
| Bailey, Jena, BS   | Jill, Jaya, MD           | Neal Kawas, BS        |
| Hetzer, Nicole MD  | Jahng, Joelle, MS        | Klimecky, Laureen, MS |
| Hourany, Talia, BS | Lomovtsev, Alexandre, MS |                       |
- 2002-current Orthopaedic 99: Student Research Program for undergraduates. From 2007:
- |                         |                     |                    |
|-------------------------|---------------------|--------------------|
| Arad, Moran             | Chang, Jin Suk      | Combs, John Walter |
| Bassig, Jonathan Edward | Chen, Jenny I-Chen  | Dao, Phuong H      |
| Chang, Calvin           | Chin, Jesse Wei-Lun | Delman, Connor M   |



Du, Xia	Kawas, Neal Percy	Roe, Allison
Farzam, Danielle	Kim, Andrew Sungjoon	Schreiber, Shana
Garza, Luis Angel	Kulik, Janelle Brittany	Seger, Christian
Gasparian, Gregory	Lai, Kha	Siman, Elham
Gill, Gagandeep	Le, Vy Thuy	Sumida, Brandon Ethan
Groysberg, Victoria Maria	Lee, Brittany Marie	Tsang, Sze Hon
Holtz, Jeffrey Charles	Lee, Jeff Hu	Tse, Cindy Ying
Hourany, Talia	Mengqi Xia	Wilensky, Leah Tess
Hsueh, Justin Chen	Mgerian, Michael Gregory	Wong, Steven
Izadi, Sohrab	Newton, James Lowell	Wu, John
Jabori, Sinan Osama	Nguyen-Cuu, Jolene	Xu, Yang
Janco, Jacob Tran	Olkiewicz, Barbara Eva	Yajnik, Meghana Vijay
Jeng, Jinfae	Phung, Duy Linh Tue	Yao, Yujia
Jung, Jane	Pochop, Martin Josef	Zhang, Qian

2010-2012 Orthopaedic 199 class – Upper Division Research class for undergraduates.  
 Kawas, Neal Hourany, Talia Chin, Jesse

2008, 2010 Short Term Training Program for first year Medical students  
 Hetzer, Nicole Liao, Vivian Kotter, Haleigh

2010, 2012 Applied Math Research Experience for Undergraduate program  
 Beylerian, Emily Gross, Ben Schaeffer, Hayden  
 Blanco, Christian Kastein, Hanna Wilson, Rayan  
 de Silva, Brian Kim Hanna  
 Drayer, Ian Mohler, George

2005-current Volunteer Program  
 Gill, Jaya Lomovtsev, Alexander, MS Harding, James  
 Gill, Gagandeep Mitov, Plamen, MS Vandan, Patel  
 Bassig, Jonathan Hourany Talia  
 Hong, Jihee Du, Xia

## PRESENTATIONS AND POSTERS

### International

- 1997 Pinching in longitudinal and alternate osteons during cyclic loading, 4th International Conference in Composites Engineering, Hawaii.
- 1998 A first estimate of prestress in so-called circularly fibered osteonic lamellae, 11th conference European Society of Biomechanics, Toulouse, France.
- 1999 Evidence of macroscopic prestress in human femoral shaft, 17th conference of the International Society of Biomechanics, Calgary, Canada.
- 2003 Mathematical models of secondary osteons, Scanning 2003, San Diego.
- 2004 Distribution of collagen bundle orientation in human secondary osteons, Scanning 2004, Washington D.C.
- 2004 Collagen bundle orientation in human secondary osteons, Gordon Research Conference, Musculoskeletal Biology and Bioengineering, Proctor Academy, New Hampshire.
- 2004 Collagen bundle orientation in human secondary osteons in the radial direction, Annual meeting of the American Society of Bone and Mineral Research, Seattle, Washington.
- 2006 Primary cilia orientation relative to chondrocyte orientation in growth plate cartilage: a mathematical algorithm on multiphoton microscopical visualization, International

- Workshop on Growth Plate, Portland, Oregon.
- 2006 Primary cilia: a mathematical algorithm for orientation assessment in growth plate cartilage on multiphoton microscopy images, Research Day, Orthopaedic Hospital, Los Angeles.
- 2006 Methodology to assess the primary cilium of chondrocytes, Annual meeting of the American Society of Bone and Mineral Research, Nashville, Tennessee.
- 2007 Localization and orientation of the chondrocytic primary cilia in the growth plate, Summer Research Conference "Cilia and Flagella", Federation of American Societies for Experimental Biology, Saxton's River, Vermont.
- 2007 Visualizing the primary cilium of connective tissue cells by multiphoton microscopy, Summer Research Conference "Cilia and Flagella", Federation of American Societies for Experimental Biology, Saxton's River, Vermont.
- 2007 Mechanical implications of collagen-apatite orientation in human secondary osteons, 9th International Conference on the Chemistry and Biology of Mineralized tissues, Austin, Texas.
- 2008 Three-dimensional characterization of primary cilia, tenocytes, and matrix in extensor tendon, 54th annual meeting Orthopaedic Research Society, San Francisco, California.
- 2008 Orientation and length of the chondrocytic primary cilium in the growth plate, 54th annual meeting Orthopaedic Research Society, San Francisco, California.
- 2008 New link between trabecular specifications and t-score of the human femur, Annual meeting of the American Society of Bone and Mineral Research, Montreal, Canada.
- 2009 *Ofd1* plays a critical role in antero-posterior patterning and ciliogenesis during limb development, 55th annual meeting Orthopaedic Research Society, Las Vegas, Nevada.
- 2009 Primary cilia are highly oriented with respect to collagen direction and long axis of extensor tendon, 55th annual meeting Orthopaedic Research Society, Las Vegas, Nevada. NIRA Award winner.
- 2009 A new multi-scale tool for stress/strain evaluation in bone tissue, American Society of Bone and Mineral Research, Annual meeting, Denver, Colorado.
- 2009 Two advancements in micro-structural variation within the macro-structure of human bone, German Association for Computational Mechanics, Section on Computational Bone Mechanics, 3rd Colloquium on Computational Mechanics for Young Scientists from Academia and Industry, Leibniz Universität Hannover, in Hannover, Germany, September 21-23.
- 2010 Towards patient-specific hierarchical simulation of proximal femur, 56th annual meeting Orthopaedic Research Society, New Orleans, Louisiana.
- 2010 Patient-specific multi-scale model of femoral compact bone, 16th US National Congress of Theoretical and Applied Mechanics, State College, Pennsylvania.
- 2010 Patient-specific hierarchical simulation of proximal femur, 10th International Conference on the Chemistry and Biology of Mineralized tissues, Carefree, Arizona.
- 2011 Primary cilium function in murine growth plate organization: a mathematical model, 56th annual meeting Orthopaedic Research Society, Long Beach, California.
- 2011 Anabolic parathyroid hormone treatment improves cortical bone microstructure, Annual meeting of the American Society of Bone and Mineral Research, San Diego, California.
- 2012 Parathyroid hormone treatment improves cortical bone micro-structure by improving collagen type I in postmenopausal women with osteoporosis, Annual Meeting Orthopaedic Research Society, San Francisco, California.
- 2012 Differences in cortical micro-structure between hypo- and hyper- parathyroidism in women, 12th meeting of the International Society of Bone Morphometry, Minneapolis, Minnesota.
- 2013 Differences in cortical micro-structure between women and men with hypo- or hyper-parathyroidism, 19th meeting of the European Society of Biomechanics, Patras, Greece.

## Regional

- 2008 Three-dimensional virtual rendering and modeling of single human secondary osteon. Abaqus Medical Seminar, Beckman Laser Institute, UC Irvine.

## Local

- 1993 Lectures on teaching of mathematics, public school teacher continuing education, University of San Diego Extension, West Los Angeles.
- 1994 Resolving Math Anxiety, Expanding Your Horizon, Math Science Interchange, a conference that encourages underprivileged girls in middle and high school to consider careers in mathematics and science, Loyola Marymount University, Los Angeles.
- 2001 Resolving Math Anxiety, Expanding Your Horizon, Math Science Interchange, a conference that encourages underprivileged girls in middle and high school to consider careers in mathematics and science, Loyola Marymount University, Los Angeles.
- 2005 Techniques for detection of bone quality, Procter & Gamble, Cincinnati.
- 2005 Virtual bone – Bone quality assessment, Larta Institute, Technology Transfer Conference - Project T2, Los Angeles.
- 2008 Bone - in terms of its substructures, Amgen Inc., Discovery group, Thousand Oaks, California.
- 2008 Galileo's observations of human bone: an update, Italian Scientists in USA-West Coast, Italian Institute of Culture, Los Angeles.
- 2009 Resolving Math Anxiety, Expanding Your Horizon, a conference that encourages underprivileged girls in middle and high school to consider careers in Mathematics and Science, Loyola Marymount University, Los Angeles.
- 2010 Effective Learning of Mathematics, Expanding Your Horizon, Math Science Interchange, a conference that encourages underprivileged girls in middle and high school to consider careers in Mathematics and Science, Loyola Marymount University, Los Angeles.
- 2013 Overcoming Math Anxiety. Workshop for girls within Expanding Your Horizon, Math Science Interchange, a conference that encourages underprivileged minority girls in middle and high school to consider careers in Mathematics and Science, Mount Saint Mary's College, Doheny Campus, Los Angeles.
- 2014 Overcoming Math Anxiety. Workshop for parents and teachers within Expanding Your Horizon, Math Science Interchange, a conference that encourages underprivileged minority girls in middle and high school to consider careers in Mathematics and Science, Mount Saint Mary's College, Doheny Campus, Los Angeles.

## UCLA Affiliated

- 2002 Long bones' osteonic lamellae: building blocks of the compact macrostructure, Research Day, Orthopaedic Hospital, Los Angeles.
- 2003 Mathematical models of compact bone microstructure, Research Day, Orthopaedic Hospital, Los Angeles.
- 2004 Collagen bundle distribution in human secondary osteons, Research Day, Orthopaedic Hospital, Los Angeles.
- 2006 Novel quantification of trabecular density and trabecular thickness in human proximal femur – with Nicole Hetzer through Short Term Training Program, UCLA.
- 2007 Alterations of trabecular bone in an animal model of type 2 diabetes, The Stein Oppenheimer Endowment Fund Awards, University of California at Los Angeles.
- 2010 Effect of hyperlipidemia on collagen orientation with PTH treatment in a mouse model with Haleigh Kotter through Short Term Training Program, UCLA.
- 2010 PTH affects collagen orientation in cortical bone of osteoporotic patients with Vivian Liao through Short Term Training Program, UCLA.

- 2010 Investigating ciliated chondrocytes: a mathematical approach with Christian Blanco, George Mohler, Ian Drayer, Hannah Kim and Ryan Wilson, through UC LEADS and NSF Research Experience for Undergraduates, UCLA.
- 2012 Differences in cortical micro-structure between hypo- and hyper- parathyroidism in pre- and post- menopausal women, Research Day, Orthopaedic Hospital, Los Angeles, with Laureen Klimecky.
- 2012 Investigating growth plate images of genetically manipulated mice: an automatic method with Emily Beylerian, Brian de Silva, Ben Gross, Hanna Kastein.

#### COMPUTER LANGUAGES AND SOFTWARE

Abaqus, finite element program to simulate mechanical loading of bone  
Maple and Matlab, for mathematical modeling of bone micro-structures  
Metamorph and XaraX, for analysis and quantification of micro-structural images  
Python 3.1, for analysis of large data sets and preparation of bone structural models

#### LANGUAGES

English, French, Italian

#### Additional Information

DOB March 24, 1956

Status Married to Patrick Del Duca, Professor of Law from Practice, UCLA Law School

Child Zachary Del Duca, 12th grade, Lycée Français of Los Angeles

Sports Running, National Referee candidate and certified Advanced Referee of American Youth Soccer Association