

CLARE MARIE RIMNAC

UNIVERSITY ADDRESS

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HOME ADDRESS

Shaker Heights, OH

PERSONAL

Date and Place of Birth: February 2, 1956 Chicago, Illinois

EDUCATION

Lehigh University, Bethlehem, PA	Ph.D.	1983	Metallurgy and Materials Engineering
Lehigh University, Bethlehem, PA	M.S.	1980	Metallurgy and Materials Engineering
Carnegie-Mellon University, Pittsburgh, PA	B.S.	1978	Metallurgy and Materials Science

PROFESSIONAL EXPERIENCE

Academic

CASE WESTERN RESERVE UNIVERSITY, Cleveland, OH:

2007-Present	Chair, Mechanical and Aerospace Engineering
2006-Present	Wilbert J. Austin Professor of Engineering
2000-2007	Director, Musculoskeletal Mechanics and Materials Laboratories
2005-Present	Professor, Department of Mechanical and Aerospace Engineering
2005-Present	Professor, Department of Biomedical Engineering (secondary appointment)
2005-Present	Professor, Department of Orthopaedics (secondary appointment)
1996-2005	Associate Professor, Department of Mechanical and Aerospace Engineering
2004-Present	Associate Professor, Department of Biomedical Engineering (secondary appointment)
1997-Present	Associate Professor, Department of Orthopaedics, School of Medicine (secondary appointment)

CORNELL UNIVERSITY MEDICAL COLLEGE, New York, NY:

1989-1996	Associate Professor of Applied Biomechanics in Surgery (Orthopaedics)
1985-1989	Assistant Professor of Applied Biomechanics in Surgery (Orthopaedics)

LEHIGH UNIVERSITY, Bethlehem, PA:

1979-1982	Teaching Assistant, Department of Metallurgy and Materials Engineering
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CARNEGIE-MELLON UNIVERSITY, Pittsburgh, PA:

1976-1978	Teaching Assistant, Department of Metallurgy and Materials Science
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Clinical

THE HOSPITAL FOR SPECIAL SURGERY, New York, NY:

1990-1996	Associate Engineer, Department of Applied Biomechanics
1991-1994	Supervisor for Materials, Department of Applied Biomechanics
1987-1990	Supervisor for Quality Assurance, Department of Applied Biomechanics
1984-1989	Assistant Engineer, Department of Applied Biomechanics

Research

THE HOSPITAL FOR SPECIAL SURGERY, New York, NY:

1996-1997	Visiting Scientist, Research Division
1995-1996	Senior Scientist, Research Division
1988-1995	Associate Scientist, Research Division
1984-1988	Assistant Scientist, Research Division
1983-1984	Postgraduate Research Fellow, Department of Biomechanics

ADDITIONAL EDUCATION

Radiation Sterilization of Medical Polymers, University of Wisconsin, October, 1994
Infrared Spectroscopy, Bowdoin College, July 1992.
Training in physical characterization of polymers, Institute for Polymers and Polymer Testing, University of Stuttgart, West Germany, July 1988.
Quality Auditing, American Society for Quality Control, February-March, 1988.
Quality Assurance Programs for Good Manufacturing Practices, Stat-A-Matrix Institute, August, 1987.

HONORS AND AWARDS

2008 Distinguished alumni award, Department of Metallurgy and Materials Engineering, Lehigh University, Bethlehem, PA
2006 Wilbert J. Austin Professor of Engineering
2006 The Otto AuFranc Award of The Hip Society
2002-2006 National Institutes of Health Musculoskeletal Oral and Skin Sciences Study Section Member
2002 Nominee for the CWRU Carl F. Wittke Award for undergraduate teaching
2000 Who's Who in Plastics and Polymers
1999 Fellow, American Institute for Medical and Biological Engineering
1994 The Knee Society Award
1992-1996 NIH Research Career Development Award
1991 Young Investigator, 3rd U.S.A.-China-Japan Conference on Biomechanics
1989 AAOS Ann Doner Vaughan Kappa Delta Award
1987-1991 NIH First Independent Research Support and Transition Award, NIH
1985 The Frank Stinchfield Award of The Hip Society
1984 The Hospital for Special Surgery Philip D. Wilson Award
1980-82 Lehigh University IBM Graduate Fellowship
1976 Carnegie-Mellon University Faculty Women's Club Award

MEMBERSHIPS

American Academy of Orthopaedic Surgeons (Associate Member / Basic Science)
American Chemical Society (through 2001)
American Institute for Medical and Biological Engineering
American Society of Biomechanics
American Society for Metals
American Society for Testing and Materials
Orthopaedic Research Society
Sigma-Xi
Society for Biomaterials
Society of Plastics Engineers
The Office of Women in Medicine (Cornell University Medical College, 1984 - 1995)

COMMITTEES AND ACTIVITIES AT CASE WESTERN RESERVE UNIVERSITY

2007-Present Policy Committee, Case School of Engineering
2007 Biomedical Engineering Chair Search Committee
2006 NSF-ACES Brainstorming Ad-Hoc Committee (Chair)
2005-2007 University Planning and Budget Committee
2005-2006 Graduate Studies Committee of the Case School of Engineering
1997-Present Orthopaedic Research Committee (Department of Orthopaedics)
1996-Present Orthopaedic Total Joint Replacement Committee (Department of Orthopaedics)
2004-2005 University Academic Strategic Planning Committee
2003-2004 Strategic Planning Committee for the Case Center for Women
2002-2004 Steering Committee, Women in Science and Engineering Roundtable (WISER) Program
2001-2003 President's Advisory Council on Women
2000-2001 Search Committee, Dean of the School of Engineering
1999-2003 Society of Women Engineers, Faculty Advisor
1999-2002 Graduate Studies Committee of the Faculty Senate
1998-2003 Committee on Appointments, Promotion and Tenure (Department of Orthopaedics)
1998-2000 Advisory Committee, Center for Science and Math Education
1998-2000 Executive Committee of the Case School of Engineering

March, 2008

1997-2003 Status of Women Faculty Committee of the Faculty Senate (**Acting Chair, Fall, 1997**)
1997-1998 Smith -Treuhaft Scholarship Panel
1996-1998 Freshman Orientation Transitions

COMMITTEES AT THE HOSPITAL FOR SPECIAL SURGERY

1990-1991 Ad-Hoc Survey Committee, Research Division
1988-1995 Library Committee
1986-1995 Resident Selection Committee
1985-1987 Vice President, The Office of Women in Medicine, Cornell University Medical College
1984-1988 Child-Care for New York Hospital/Cornell University Medical College Committee, The Office of Women in Medicine

NATIONAL AND INTERNATIONAL BOARDS AND COMMITTEES

2008 2nd Vice-President (Presidential line), Executive Board, and Board of Directors, Orthopaedic Research Society
2007 University of California at Berkeley, Department of Mechanical Engineering External Advisory Board
2007-Present Women's Orthopaedic Leadership Forum of the Orthopaedic Research Society (**Founding Member**)
2007 Scientific Committee Organizer of the 3rd UHMWPE International Meeting, Madrid, Spain, September 2007.
2007 Combined Orthopaedic Research Society Program Committee member
2007-2010 Orthopaedic Research Society Board of Directors member
2005-2008 Orthopaedic Research Society Program Committee (3-year member, **Program Chair 2007-2008**)
2001-2002 Orthopaedic Research Society Program Committee (adjunct member)
2001-2002 Orthopaedic Research Society Nominating Committee
2000-2002 American Academy of Orthopaedic Surgeons Research, Bioengineering and Biomaterials Panel
1999-Present American Society for Testing and Materials, F 04 Committee
1997-2003 American Academy of Orthopaedic Surgeons Biomedical Engineering Committee
1995-2001 American Academy of Orthopaedic Surgeons Subcommittee on Orthopaedic Basic Science Evaluation
1995-1998 Orthopaedic Research Society Education and Special Projects Committee (**Chair, 1997-1998**)
1993-1994 Orthopaedic Research Society Program Committee, 1994 Annual Meeting
1992-1993 Society for Biomaterials Program Committee (adjunct member)
1991-1992 Society for Biomaterials Awards, Ceremonies and Nominating Committee

REVIEWER

Grant Applications

National Institutes of Health (Regular study section member, Musculoskeletal Oral and Skin Sciences Study Section, 2002-2006)
National Institutes of Health (Ad-Hoc reviewer, Orthopaedic Study Section, November, 2001)
National Institutes of Health (Special reviewer, NCCR applications, February, 1999)
National Institutes of Health (Special reviewer, AREA applications, July, 1998)
National Science Foundation (Invited reviewer, Division of Undergraduate Education, July, 1996)
National Institutes of Health (Ad-Hoc reviewer, Orthopaedic Study Section, June 1996)
National Institutes of Health (Regular study section member, NRSA applications, Clinical Sciences, Subcommittee 1, 1990-1994)
National Institutes of Health (Special Reviewer, SBR applications)
Medical Research Council of Canada (Special reviewer)
Department of Health, State of Nebraska Research of Cancer and Smoking Disease (Special reviewer)

Journals

Journal of Bone and Joint Surgery (**Deputy Editor for Research, 2003-present**)
Journal of Biomedical Materials Research (Board of Editors, 1996-2003)
Journal of Orthopaedic Research (Board of Associate Editors, 1991-2003, **Editorial Advisory Board, 1998-2004**)

March, 2008

Clinical Materials (Editorial Advisory Board, 1990-1994)

American Society for Materials

Bone

Biomaterials

Calcified Tissue International

Journal of Applied Biomaterials

Journal of Biomechanics

Journal of Biomechanical Engineering

RESEARCH ACTIVITIES

Mechanical Properties of Polymeric Biomaterials

Characterization and constitutive modeling of the cyclic and static mechanical performance of ultra high molecular weight polyethylenes, poly(aryl-ether-ether-ketone), acrylic polymers, and other non-resorbable and resorbable polymeric biomaterials as a means of understanding in-vivo failure mechanisms and of improving the performance of these implant materials. Examination of the effect of sterilization, shelf-life aging and in-vivo aging on the degradation of the physical, chemical and mechanical properties of polymeric biomaterials as a means of improving degradation resistance and long-term performance of implants.

Mechanical Properties of Bone Tissue

Identification of ultrastructural and microstructural mechanism(s) for permanent deformation in bone tissue by measuring mechanical properties in creep, torsion, tension, compression, bending, and fatigue. Correlation of mechanical performance with microstructural and ultrastructural properties of normal, treated (e.g., radiation sterilized), and diseased bone tissue.

Implant Retrieval Analysis

Failure and damage analysis of orthopaedic and other medical implants removed at revision or re-operation surgery to determine the cause of failure and the mechanisms responsible for the damage. Application of results in design analyses to improve the performance of implant designs.

3D Bone Scaffolds for Repair of Critical-Sized Craniofacial Defects

Design, manufacture by rapid prototyping methods, and validation of three-dimensional (3D) scaffolds for repair of large structural bone defects using resorbable polymers such as poly(propylene fumarate).

TEACHING

Case Western Reserve University School of Engineering

Fall 1996-2002 EMAE 480 Fatigue of Materials
Spring 2004-present

Spring 1997-1998,
2000-2003 EMAE 372 Relation of Materials to Design
Fall 2003-2005

Spring 1999, 2001,
2002, 2005-2007 EMAE 415 Musculoskeletal Biomechanics

Spring 1997-1998,
Fall 1997 EMAE 172 Mechanical Manufacturing (selected lectures)

Spring, 1997 EBME 405 Materials for Prosthetics and Orthotics (team-taught)
Fall 1998, 2000-2005

Case Western Reserve University School of Medicine/University Hospitals Case Medical Center

Fall, 2000-2005 Medical School Core Curriculum: Annual lecture on biomechanics of skeletal tissues

Spring, 1997-present Orthopaedic Resident Core Curriculum: Annual lectures on Properties of Implant Materials

Fall, 2002-2005 Orthopaedic Resident Core Curriculum: Annual lectures on Mechanical Behavior of Biological and Implant Materials

Other Teaching Activities

2001-present Annual lectures on mechanical properties of biomaterials and orthopaedic biomechanics, Montefiore Hospital, New York, NY.

2002 Wear in UHMWPE Total Joint Replacements, Department of Orthopaedics resident lecture series, Cleveland Clinic Foundation, Cleveland, OH.

1985-1995 Annual lectures on properties of orthopaedic biomaterials and development of implants, CORE curriculum, The Hospital for Special Surgery, New York, NY.

1985-1995 Annual lectures on mechanical properties of biomaterials and orthopaedic biomechanics, Montefiore Hospital, New York, NY.

1984-1995 Annual lectures on mechanical performance of implant materials, Department of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY.

1985-1995 Annual lectures on mechanical properties of biomaterials and orthopaedic biomechanics, Lenox Hill Hospital, New York, NY.

1990, 1988 Lectures on implant materials, Department of Materials Science and Engineering, Lehigh University, Bethlehem, PA.

1989, 1987,
1985 Elastic behavior of materials and properties of implant materials, George Washington University, Washington, D.C.

SUPERVISION OF RESEARCH ACTIVITIES

Case Western Reserve University

Graduate Students - Department of Mechanical and Aerospace Engineering

Ph.D. Students

Michael Sobieraj, M.S.: Constitutive modeling of UHMWPE and PEEK medical polymers (M.D./Ph.D. candidate, anticipated graduation of Ph.D., January, 2008).

Ravi Varadarajan, M.S.: On the nature of static and cyclic fatigue crack growth in UHMW polyethylenes (**Ph.D. awarded, January, 2007**).

Malcolm Cooke: Rapid prototyping of resorbable skull implants (**Ph.D. awarded, August, 2004**).

Kirk Olsen: Fatigue failure of aircraft bolts (**Ph.D. awarded, August 2004**).

Ozan Akkus: The Relation of Microdamage to Fracture and Material Property Degradation in Human Cortical Bone Tissue (**Ph.D. awarded, August 2000**). Present position: Associate Professor, Bioengineering, Purdue University).

M.S. Students

Katy Lee: Hydrostatic stress effects on damage of cortical bone tissue (co-advisor with Prof. John Lewandowski, **M.S. awarded, January, 2007**).

Thomas Penoyar: Effect of microdamage and strain rate on the fracture resistance of human cortical bone (**M.S. awarded, August, 2004**).

Irebert Delgado, B.S.: Retirement-for-cause fatigue analysis of aircraft engine rotor disks (**M.S. awarded, May, 2004**).

Sara Gencur, B.S.: Fracture behavior of highly crosslinked UHMW polyethylenes (**M.S. awarded, May, 2004**).

Michael Sobieraj, B.S.: Constitutive modeling of UHMW polyethylene (**M.S. awarded, January, 2004**).

Allison Stawarz, B.S.: Short and long fatigue crack growth in bone (**Case Prime Fellow, NSF Graduate Fellow, M.S. awarded, January 2001**).

Rebecca Lehman Thomas, B.S.: Cyclic stability and constitutive modeling of UHMW polyethylene materials (**M.S. awarded, January, 2001**).

Eric Kolb, B.S.: A Finite Element Analysis of Design Factors Affecting Performance of Acetabular Components in Total Hip Arthroplasty (**M.S. awarded, May 2000**).

Gail Perusek, B.S.: Design and Test of an Extensometer for Global Measurement of Bone Strain Suitable for Use In Vivo in Humans (**M.S. awarded, May 2000**).

Matthew Collier, B.S.: Radiographic measurement methods to determine hip anteversion and wear in total hip replacements (**M.S. awarded, January 2000**).

Elizabeth Karla Dapp, B.S.: Effect of notch-preparation on the J-integral static fracture resistance of ultra high molecular weight polyethylene (**M.S. awarded, January, 1999**).

Patrick Dunlap, B.S.: Effect of resin type and sterilization Method on the fatigue crack propagation behavior of ultra high molecular weight polyethylene (**M.S. awarded, January, 1998**).

Graduate Students - Department of Biomedical Engineering

Sameer Rohatgi, B.S.: Failure analysis of MG I and II retrieved total knee replacements (**M.S. awarded, January, 1998**).

Undergraduate Students (selected)

Jennifer Brinkman: Effect of large-strain deformation on the crystallinity of conventional and crosslinked UHMWPEs (2007-2008).

Megan Aanstoos: Notch strengthening of conventional and crosslinked UHMWPEs (Senior Project, 2005-2006),

Natalie Kelly: Radiographic wear of crosslinked UHMWPE acetabular hip components (Senior Project, 2004-2005).

Karlos Mackey (Fisk): Dynamic fracture behavior of UHMWPE (summer, 2004).

Angela Wong (Cornell): Wear of crosslinked UHMWPE (summers, 2003 and 2004).

Sara Gencur: Fracture behavior of highly crosslinked UHMW polyethylenes (Senior Project, 2002-2003).

Tom Penoyar: Bone Ingrowth into biologically active and biologically inert porous surfaces (Senior Project, 2002-2003).

Adam Ratzel and Sara-Jane Anderson: Mechanical degradation of human cortical bone (Experimental Project, 2001).

Allison Olinginski: Fracture toughness of acrylic bone cement (Senior Project, 2000-2001).

Elizabeth Perepezko: Microrack damage formation in gamma radiation sterilized bone allografts (Senior Project, 1999-2000, **recipient of a Materials Research Society Fellowship**).

Rebecca Lehman: Material and Design Factors Affecting Severe Rim Wear Damage in Acetabular Hip Components (Senior Project, 1999).

Sara Platte: Retrieval Analysis of Hylamer-M UHMW polyethylene tibial knee components (1997-1998) and ultrastructural analysis of UHMW polyethylene lamellae during deformation (Senior Project, 1998-1999).

Heather Konko: Failure analysis of fractured total hip replacement metal femoral components (Senior Project, Spring, 1997).

Engineering Postdoctoral Fellows

Mary Matthiesen, Ph.D. Damage accumulation and histomorphometry of human cortical bone (2002-2003).

Ramazan Kayacan, Ph.D.: Fatigue crack growth in human cortical bone (2002-2003). Current position: Assistant Professor, Department of Mechanical Engineering, Suleyman Demirel University, Isparta, Turkey.

Research Residents and Visiting Medical Fellows – Department of Orthopaedics

James Murphy, M.D.: Monotonic and cyclic behavior of conventional and crosslinked UHMWPEs under triaxial stress conditions (2007-2008).

Ryan Garcia, M.D.: Effect of radiation on the fatigue and creep behavior of cortical bone; retrieval analysis of total knee replacements (2006-2007).

Steven Fitzgerald, M.D.: Effect of radiation on the fatigue and creep behavior of cortical bone (2005-2006).

Nam Choi, M.D.: Wear of conventional and crosslinked UHMWPE total hip replacement components (2003-2004)

Sam Akhavan, M.D.: Fatigue crack growth in radiation sterilized human cortical bone (2002-2003).
Recipient of the Barry Friedman Award.

Nayoa Taki, M.D.: UHMW polyethylene wear and damage (2000-2003).

Erika Mitchell, M.D.: Short and long fatigue crack growth in radiation sterilized human cortical bone (2000-2001). **Recipient of the Ruth Jackson Society Resident Research Award).**

Sabine Schmitt, M.D.: Effect of resin type and manufacturing method on wear damage to IB I and IB II UHMW polyethylene tibial knee components (1999).

Choong-Hee Won, M.D., Ph.D.: Effect of resin type and manufacturing method on wear damage to MG I and MG II UHMW polyethylene tibial knee components (1997-1998).

Medical Students

Leah Schulte, B.S.: Bone Ingrowth into biologically active and biologically inert porous surfaces (2001-2003).

Jesse Torbert, M.S.: Bone Ingrowth into biologically active and biologically inert porous surfaces (2001-2003).

Gina Jefferson, B.S.: Generation of in vitro UHMW polyethylene wear debris (summer, 1997).

High School Students

Ashley McKee (MidPark): Density measurements of bone tissue (2005).

Angela Wong: Implant retrieval analysis (summer 2002).

Bridget Gallagher: Implant retrieval analysis (summer 2002).

Alexandra Breedlove (Hathaway Brown): Ultrastructural and microstructural damage mechanisms in human bone tissue (1999 –2002).

Michael Hering (Shaker Middle School): Relationship between stiffness, strength, and density of woods (2000).

Research Engineers

Rebecca Thomas, M.S.: Orthopaedic implant retrieval analysis (2001-present).

Jay Bensusan, M.S.: Orthopaedic biomechanics (1999 – present).

David Krzypow, M.S.: Orthopaedic implant retrieval analysis, fatigue crack propagation behavior and cyclic stabilization behavior of UHMW polyethylene (1996 - 2000).

The Hospital for Special Surgery (1983-1995)

Engineering Graduate Students

Steven Kurtz (Cornell University, Mechanical and Aerospace Engineering): Chemical and mechanical degradation of polyethylene joint components (1990-1994). Ph.D. dissertation co-advisor.

Ji-Yhun Koo (Brown University, Division of Engineering): Fatigue crack propagation in ultra high molecular weight polyethylene under fully compressive loading (1992).

Katrin Elbert (Cornell University, Mechanical and Aerospace Engineering): Surface damage in polyethylene joint components (1988).

Engineering Undergraduate Students

Kevin Shea (Cornell University, Mechanical and Aerospace Engineering): Mechanical properties of ultra high molecular weight polyethylene (1995).

Nitin Khanna (University of Pennsylvania, Bioengineering): Post-irradiation aging of polyethylene (1992-1993). Ad-hoc senior thesis advisor.

Eric Knochenhauer (Johns Hopkins, Materials Engineering): Fracture mechanics of polyethylene (1986).

Louis Boogh (Lausanne, École Polytechnique, Materials Engineering): Mechanical properties of polyethylene, microstructural analysis of implant metal alloys (1985).

James Thompson (Lehigh University, Materials Engineering): Fracture mechanics of acrylic bone cement (1984).

Research Engineers

Rumana Huq, B.S.: Mechanical testing core laboratory projects (1995).

Todd Baldini, M.S.: In vitro degradation behavior of polyethylene and mechanical behavior of cancellous bone tissue (1994 - 1995).

Alesia Bennett, B.S.: Mechanical properties of compact bone, retrieval analysis and examination of total joint replacement components, degradation of polyethylene, and quality control of implantable materials for manufacture of total joint replacement components (1988 -1994).

Robert Klein, B.S.: Fracture and degradation behavior of polyethylene, retrieval analysis and examination of total joint replacement components, and quality control of implantable materials for manufacture of total joint replacement components (1986 -1994).

Postdoctoral Fellows

Franz Menschik, M.D. (Hospital for Special Surgery Biomechanics Fellow): Effect of environment and sterilization on the fracture resistance of polyethylene; mechanical behavior of osteoporotic cancellous bone (1994-1995).

Nancy Camacho, Ph.D. (Hospital for Special Surgery, NIH Training Grant Fellow): Effect of ultrastructure on the mechanical properties and permanent deformation mechanisms of compact bone (1992-1994).

Olga Huk, M.D. (Hospital for Special Surgery, Hip Fellow): Generation of metal and polyethylene debris from modular acetabular hip components (1992-1993).

Residents

Jay Lieberman, M.D. (Hospital for Special Surgery, Hip Fellow): Head-neck taper interfaces of modular femoral hip components (1991-1992).

Robert Schwartz, M.D. (Hospital for Special Surgery, Biomechanics Fellow): Permanent deformation of compact bone and retrieval analysis of porous-coated implants (1984-1985).

Mathias Bostrom, M.D. (Hospital for Special Surgery): Degradation in polyethylene total knee components as a result of sterilization, storage and in-vivo use (1993-present).

Donna Astion, M.D. (University Hospitals, Case Western Reserve University): Generation of polyethylene debris from metal-backed acetabular hip components (1992).

Medical Students

Liat Kaplan (Cornell University Medical College): Cyclic stress-strain behavior of polyethylene (1995).

Paul Simic (Cornell University Medical College): In-vivo degradation of polyethylene (1994).

Kurt Voellmicke (Cornell University Medical College): Effect of Boron deficiency on mechanical behavior of compact bone (1993).

Jay Weintraub (Cornell University Medical College): Post-irradiation aging of polyethylene (1992).

Carlos Garcia (Cornell University Medical College): Chemical degradation analysis of polyethylene (1991).

Lawrence Levin (Cornell University Medical College): Retrieval analysis and examination of total shoulder replacements (1991).

Elana Schapiro (Cornell University Medical College): Chemical degradation analysis of polyethylene (1991).

Lance Peters (Cornell University Medical College): Retrieval analysis and examination of in-vivo degradation of polyethylene total hip and total knee components (1989-1990).

Donna Pacicca (New York University Medical College): Retrieval analysis and historical documentation of total joint replacements (1989); Characterization of bovine bone (1990).

Donna Astion (Albert Einstein Medical School): Permanent deformation of compact bone (1985).

Roger Frey (Cornell University Medical College): Permanent deformation of compact bone (1984).

Dennis McGill (New York University Medical College): Setting properties of acrylic bone cement with and without centrifugation (1984).

Craig Gordon (Cornell University Medical College): Retrospective study of T-28® type hip replacements (1984).

Benisse Lester (Cornell University Medical College): Retrospective study of T-28® type hip replacements, and of antibiotics in bone cement (1983).

High School Students

John Afthinos (Bronx High School of Science): Mechanical behavior of vertebral monkey bone (1995). (**A Westinghouse Science Project Semifinalist**).

Raena Selip (Bronx High School of Science): Degradation of retrieved polyethylene tibial knee components (1993). (**A Westinghouse Science Project Semifinalist**).

Doug Paget (Fieldston High School): Effect of Boron deficiency on mechanical behavior of compact bone (1993).

RESEARCH SUPPORT (Pending, Active, Past)

Pending

Sulzer (2008-2010)
Sulzer Settlement Trust
\$1,000,278

Co-investigator (Edward Greenfield, P.I.)

Active

Musculoskeletal Transplant Foundation (2008)
\$124,995
Biomechanical Consequences of Gamma Radiation Sterilization on Cancellous Bone Allograft

Co-Investigator (Christopher Hernandez, P.I.)

National Institutes of Health (2005-2008)
2-R01 AR47192 (NIAMS)
\$862,125
Constitutive Model for Polyethylenes in Total Joint Replacements

Principal Investigator

National Institutes of Health (2005-2010)
2-R01 AR47904 (NIAMS)
\$2,920,465
Mechanics and Performance of Traceable UHMWPE Hip Implants
Principal Investigator at CWRU (sub-contract to Drexel, Steve Kurtz, P.I.)

National Institutes of Health (2007-2012)
2 R01 DE1374001 (NIDR)
Strength and Resorption of Biodegradable Skull Implants
Co-Investigator (David Dean, P.I.)

National Institutes of Health (2007-2012)
5T32 AR07505 (NIAMS)
Training Program in Musculoskeletal Research
Co-Investigator (Ed Greenfield, P.I.)

Sulzer (2006-2009)
\$353,616
Mechanisms and Performance of Retrieved Joint Replacement Components
Co-Investigator (Victor Goldberg, P.I.)

Zimmer (2006-2009)
\$326,188
Investigation of In-Vivo Oxidation in Historical, Conventional, and Highly Crosslinked Knee Components
Co-Investigator (Matthew Kraay, P.I.)

Past

Musculoskeletal Transplant Foundation (2005-2006)
\$84,197
Inelastic Stress-Strain Behavior of Radiation Sterilized Bone
Co-Investigator (Dwight Davy, P.I.)

National Institutes of Health (2000-2005)
R01 DE1374001 (NIDR)
\$1,389,283
Strength and Resorption of Biodegradable Skull Implants
Co-Investigator (David Dean, P.I.)

National Institutes of Health (2001-2006)
5T32 AR07505 (NIAMS)

March, 2008

Training Program in Musculoskeletal Research
Co-Investigator (Roland Moskowitz, P.I.)

Zimmer (2004-2005)

\$67,500

Investigation of In Vivo Oxidation in Conventional and Highly Crosslinked UHMWPE Hip and Knee Components

Co-Investigator (Matthew Kraay, P.I.)

Musculoskeletal Transplant Foundation (2003-2004)

\$92,000

Effect of Radiation Sterilization and Mechanically Induced Damage on the Fragility of Allograft Cortical Bone

Principal Investigator

National Institutes of Health (2001-2005)

R01 AR47192 (NIAMS)

\$750,915

Constitutive Model for Polyethylenes in Total Joint Replacements

Principal Investigator

National Institutes of Health (2001-2005)

R01 AR47904 (NIAMS)

\$1,024,347

Mechanics and Performance of Traceable UHMWPE Hip Implants

Co-Investigator (sub-contract to Drexel)

National Institutes of Health (2001-2005)

R01 AR43785 (NIAMS)

\$1,178,250

Non-Linear Stress-Strain Behavior of Cortical Bone

Co-Investigator (Dwight Davy, P.I.)

National Institutes of Health (2000-2004)

R01 AG17171 (NIA)

\$606,700

Short and Long Fatigue Crack Growth in Bone

Principal Investigator

Wright Medical (2001-2002)

\$121,936

In-vivo Rabbit Studies of the Effect of Calcium-Sulfate-Based Coatings on the Osseous Integration of Orthopaedic Prostheses

Co-Investigator (Victor Goldberg, P.I.)

Zimmer (2000-2002)

\$21,316

Fatigue Crack Propagation Behavior of UHMWPEs

Co-Investigator (Victor Goldberg, P.I.)

Stryker, Howmedica, Osteonics (2000-2001)

\$34,073

Cyclic Stability of Modified UHMW Polyethylenes

Co-Investigator (Victor Goldberg, P.I.)

Wright Medical (1999-2001)

\$126,112

Cyclic Deformation and Fracture of Crosslinked UHMW Polyethylenes

Co-Investigator (Victor Goldberg, P.I.)

March, 2008

Orthopaedic Research and Education Foundation (1999-2002)

\$150,000

Prospective Randomized Study of Ceramic vs. Co-Cr-Mo Alloy Femoral Heads With respect to Wear of Polyethylene Acetabular Cups in THR

Co-Investigator (Matt Kraay, P.I.)

Musculoskeletal Transplant Foundation (1999)

\$50,000

Effect of Radiation Sterilization on the Fracture Resistance of Cortical Bone Allografts

Principal Investigator

National Institutes of Health (1996-2000)

Cellular Mechanisms of Implant Loosening

Co-Investigator (Ed Greenfield, P.I.)

Johnson & Johnson Professional (1996-1997)

Effect of Resin Type and Sterilization Method on the Static and Cyclic Fracture Resistance of UHMWPE

Principal Investigator

National Institutes of Health (1992-1997)

(Research Career Development Award)

Degradation and Fracture of Polyethylene Joint Components

Principal Investigator

National Institutes of Health (1989-1994)

Degradation in Polyethylene Joint Components

Principal Investigator

National Institutes of Health (1987-1995)

Surface Failure in UHMWPE Joint Components

Co-Investigator (Tim Wright, P.I.)

National Institutes of Health (1992-1994)

Orthopaedic Training Grant

Co-Investigator

Depuy-DuPont (1993-1994)

Degradation in Enhanced Polyethylene Joint Components

Co-Investigator

Zimmer (1993-1994)

Observations of Retrieved Zimmer Implants

Co-Investigator

National Institutes of Health (1987-1991)

(First Independent Research Support and Transition Award)

Permanent Deformation of Compact Bone

Principal Investigator

North Atlantic Treaty Organization (1988-1990)

Surface Failure and Material Degradation in Polyethylene Joint Components

Principal Investigator

DuPont (1988-1990)

Study of Extended Chain UHMWPE

Co-Investigator

Whitaker Foundation (1985-1988)
Surface Failure in Polyethylene Joint Components
Co-Investigator (Tim Wright, P.I.)

WORKSHOPS/SPECIAL CONFERENCES

Invited speaker/participant, AAOS/NIH Osteolysis and Implant Wear: Biological, Biomedical Engineering, and Surgical Principles Symposium, Austin, TX, November 2007.

Invited participant (Ohio representative), AAOS Research Capitol Hill Days, March 2007.

Invited speaker, NIH Consensus Development Conference on "Total Knee Replacement", Bethesda, MD, December, 2003.

Invited panelist, "Medical Implant Information, Performance and Policies", NIH/FDA/NIST sponsored workshop, Gaithersburg, MD, September, 2002.

Invited panelist, "Ultra-High Molecular Weight Polyethylene", 27th Annual Meeting of the Society for Biomaterials, Minneapolis, MN, April, 2001.

Session co-ordinator and moderator, "Wear 2000", AAOS & NIH sponsored workshop, Chicago, IL, October, 2000.

Co-ordinator, "Polyethylene 2001", 46th Annual Meeting of the Orthopaedic Research Society, Orlando, FL, March, 2000.

Session Organizer, Polyethylene Wear, Biomedical Engineering Society, Cleveland, OH, October, 1998.

Attendee, Gordon Research Conference on Bioengineering and Orthopaedic Sciences: "Orthopaedics at the Millenium. Develop, Repair, or Replace?" Andover, NH, July, 1998.

Invited panelist, (Biomechanical Solutions panel), "Bioengineering, Building the Future of Biology and Medicine", National Institutes of Health, Bethesda, MD, February, 1998.

Co-ordinator, "Bearing Surfaces and Biomaterials" 2nd Combined Meeting of the Orthopaedic Research Societies of USA, Japan, Canada, and Europe, San Diego, CA, November, 1995.

Invited participant, "Considerations of Implant Wear for the Future of Total Joint Replacement" AAOS & NIH sponsored workshop, Chicago, IL, September, 1995.

Invited participant, "Chemical Degradation" and "Tests to Predict Clinical Performance" Workshop on Polyethylene Wear, sponsored by the BWH / MIT-Industry Consortium for Polymeric Articulating Surfaces for Total Joint Replacement, September, 1993.

Invited panelist, "Corporate Affiliates Workshop: Prosthetic Articular Interfaces" 36th Annual Meeting of the Orthopaedic Research Society, New Orleans, LA, February, 1990.

INVITED PRESENTATIONS

"Enhanced Polyethylene", Cartilage Innovation Summit, Cleveland Clinic Foundation, Cleveland, OH, to be presented, May, 2008.

"In Vivo Degradation of Retrieved Polyethylene Total Knee Replacement Components" and "Understanding the Fracture Risk of Polyethylene Joint Replacement Components", The Center for Hip and Knee Surgery Annual Orthopaedic Symposium, Mooresville, IN, to be presented, April, 2008.

"On Mechanical Properties of UHMWPE", Invited plenary speaker, 3rd UHMWPE International Meeting, Madrid, Spain, September 2007.

"Why TKRs Fail", A Knee Innovation Summit: From Birth to Death, Cleveland Clinic Foundation, Cleveland, OH, April, 2007.

"Predicting the Performance of UHMWPE Total Joint Replacements", Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, November, 2006.

"Ionizing Radiation and Orthopaedic Prostheses", Invited plenary speaker, 6th International Symposium on Ionizing Radiation and Polymers, Houffalize, Brussels, September, 2004.

"Designer Joints: Engineering the Natural History of Total Joint Replacements", The Musculoskeletal Research Seminar Series, Case Western Reserve University and Cleveland Clinic Foundation, Cleveland, OH, January, 2004.

"Observations of Fatigue Crack Growth in Human Cortical Bone", Department of Mechanical and Aerospace Engineering, Notre Dame University, South Bend, IN, April, 2003.

"Fatigue Crack Growth in Human Cortical Bone", Zimmer, Warsaw, IN, June, 2002.

"Crack Formation and Growth in Human Cortical Bone", University of Toledo, Toledo, OH, March, 2002.

"Joint Appointment: Engineering the Natural History of Total Joint Replacements", Lorain County Community College, OH, March, 2002.

"Examining the Relationship Between Microcracking and Fracture Resistance in Human Cortical Bone: Implications for Allografts" and "UHMWPE in Total Joint Replacements: What We Know and What We Need to Know", The Center for Hip and Knee Surgery Annual Orthopaedic Symposium, Mooresville, IN, May, 2001.

"Joint Appointment: Engineering the Natural History of Total Joint Replacements", Spotlight on Women Lecture Series, Case Western Reserve University, Cleveland, OH, January, 2001.

"Examining the Relationship Between Microcracking and Fracture Resistance in Human Cortical Bone", Cleveland Clinic Foundation, Cleveland, OH, June, 2000.

"Wear in Total Joint Replacements", Ohio Aerospace Institute, Cleveland, OH, July, 1998.

"The Effect of Irradiation and Other Important Variables on Polyethylene Quality", Joint Replacement 1997, sponsored by Duke University, Pinehurst, NC, May, 1997.

"The Use of UHMW Polyethylene in Total Joint Replacements", The Cleveland Clinic, Cleveland, OH, May, 1997.

"Polyethylene Wear Issues", Johnson & Johnson Professional Advisory Panel, Boston, MA, September, 1996.

"Material Factors Affecting the Performance of Acetabular Components" and "Chemical and Mechanical Degradation of UHMWPE", The Center for Hip and Knee Surgery Annual Orthopaedic Symposium, Mooresville, IN, May, 1995.

"New Trends in Bearing Surfaces", Lenox Hill Hospital, New York, NY, May, 1995.

"Design and Material Factors Affecting the Performance of UHMW Polyethylene Joint Components", University of California, Berkeley, CA, March, 1995.

"Decreasing Wear Through Changes in Design", VI Annual Meeting Holiday Total Knee and Hip Course, New York, NY, December, 1994.

"Polyethylene Wear Debris", The Scientific / Regulatory Interface Symposium, sponsored by Bio-Research Laboratories, Ltd., the Centre for Biomaterials at the University of Toronto, and the École Polytechnique, Montréal, Quebec, October, 1994.

"The Effect of Sterilization on UHMWPE", The Summer Meeting of the Hip Society, The Hospital for Joint Diseases, New York, NY, September, 1994.

"Material Properties of Ultra High Molecular Weight Polyethylene", Polyethylene in Total Joint
March, 2008

Replacements Symposium, sponsored by the University of Toronto Centre for Biomaterials and the Wellesley Hospital Division of Orthopaedic Surgery, Toronto, Ontario, May, 1994.

"Diminution of Wear Through Implant Design", V Annual Meeting Holiday Total Knee Course, New York, NY, December, 1993.

"Degradation and Wear of UHMW Polyethylene Joint Components", Johnson & Johnson Orthopaedics PFC® Advisory Panel, Boston, MA, June 1993.

"Factors Affecting Polyethylene Wear", Johnson & Johnson Orthopaedics Advanced Sales School, Louisville, KY, and Minneapolis, MN, May, June and October, 1993, and June, 1994.

"Degradation and Wear of UHMW Polyethylene Joint Components", Case Western Reserve University, Cleveland, OH, April, 1993. (Sponsored by the CWRU President's Office to enhance the visibility of women scientist and engineers and to provide role models for prospective women scientists and engineers).

"Polyethylene Wear", IV Annual Meeting Holiday Total Knee Course, New York, NY, December, 1992.

"Polyethylene Wear in THA and TKA"; "Metal vs. Ceramic Femoral Bearing Surfaces"; and, "HA Coating: What's its Role and What Surface", North American Hip and Knee Symposium, Tucson, AZ, October, 1992.

"Mechanisms of Failure of Polyethylene Joint Components", Dartmouth Biomedical Engineering Center Fourth Annual Conference, Burlington, VT, October, 1992.

"Performance of Ultra High Molecular Weight Polyethylene Total Joint Replacement Components", Brown University, Providence, RI, May, 1992.

"Creep of Compact Bone", Beth Israel Biomechanics Seminar, Boston, MA, March, 1992.

"What are the Long-term Problems with Polyethylene and Should this Affect Implant Configuration?", Questions and Controversies in Total Knee Replacement, New York, NY, November, 1991.

"Influence of Design and Material on Wear", Techniques and Science for Successful Joint Arthroplasty, Burlington, VT, October, 1991.

"Polyethylene Wear Mechanism", William H. Harris, M.D., 21st Annual Hip Course, Boston, MA, September, 1991.

"Biomaterials", Materials/Teacher Educational Resource Summer Workshop, Department of Materials Science and Engineering, Lehigh University, Bethlehem, PA, July, 1991.

"Performance of UHMW Polyethylene Joint Components: Material and Design Factors", Hospital for Joint Diseases Orthopedic Institute, New York, NY, March, 1991.

"Prosthetic Materials: Total Joint Replacements", Materials /Teacher Educational Resource Summer Workshop, Department of Materials Science and Engineering, Lehigh University, Bethlehem, PA, July, 1990.

"Performance of UHMW Polyethylene Hip Cups: Material and Design Factors", International Orthopaedic Exchange Meeting, Center for Hip and Knee Surgery, Mooresville, IN, May, 1990.

"The Materials Scientist and Medicine", New York Chapter of The American Society for Metals, March, 1990.

"Failure Analysis of a Total Hip Replacement", Graduate Seminar, Department of Materials Science and Engineering, Lehigh University, Bethlehem, PA, October, 1988.

"Observations of Surface Damage to UHMW Polyethylene Knee Prostheses", Institute for Polymers and Polymer Testing, University of Stuttgart, West Germany, July, 1988.

"Properties of Biomaterials", Hospital for Joint Diseases Orthopedic Institute, New York, NY, December, 1987.

"Materials and Medicine", Buffalo Chapter of The American Society for Metals, Buffalo, NY, April, 1987.

"Mechanical Performance of Acrylic Bone Cement", in "Complications of Primary and Revision Total Knee Replacement", AAOS Continuing Education Course, New York, NY, 1986.

"Biomaterials for Artificial Human Joints", The New Jersey Chapter of the Metallurgical Society of The American Institute of Mining Engineers, NJ, February, 1985.

"Biomaterials for Artificial Human Joints", The Lehigh Valley Chapter of the American Society for Metals, Reading, PA, January, 1985.

"The Effect of Antibiotic Additions and Centrifugation on the Fracture and Handling Properties of Acrylic Bone Cements", The Philip D. Wilson Award Paper, 66th Annual meeting of the Alumni Association of The Hospital for Special Surgery, New York, NY, November, 1984.

PUBLICATIONS

Doctoral Dissertation

Rimnac, C.M. (1983) The Fatigue Crack Propagation Response and Fracture Surface Micromorphology of Neat and Rubber-Modified Poly(vinyl) Chloride (PVC), Lehigh University, Bethlehem, PA.

Journal Articles

1. Stone, D.H., Marich, S. and **Rimnac, C.M.** (1980) The Deformation Behavior of Rail Steels. Transportation Research Record, 744:16-23.
2. **Rimnac, C.M.**, Hertzberg, R.W. and Manson, J.A. (1981) Fatigue Fracture Surface Micromorphology in Poly (Vinyl Chloride) (PVC). In Fractography in Materials Science (ed. by L.N. Gilbertson and R.D. Zipp), ASTM STP 733, pp. 291-313, ASTM, Philadelphia.
3. **Rimnac, C.M.**, Manson, J.A., Hertzberg, R.W., Webler, S.M. and Skibo, M.D. (1981) Fatigue Crack Propagation in PVC: Effects of Molecular Weight and Specimen History. J. Macromolec. Sci.-Phys., B19(3):351-375.
4. Hahn, M.T., Hertzberg, R.W., Manson, J.A. and **Rimnac, C.M.** (1982) Discussion to 'The Molecular Weight Dependence of Fatigue Crack Propagation in Polycarbonate'. J. Mater. Sci., 17(5):1533-1535.
5. **Rimnac, C.M.**, Hertzberg, R.W. and Manson, J.A. (1982) The Fracture Behavior of a PXE/HIPS Polyblend. Polymer, 23(13):1977-1982.
6. **Rimnac, C.M.**, Hertzberg, R.W. and Manson, J.A. (1983) On the Nature of Craze Development and Breakdown During Fatigue. J. Mater. Sci. Let., 2:325-328.
7. Hertzberg, R.W., Hahn, M.T., **Rimnac, C.M.**, Manson, J.A. and Paris, P.C. (1983) A Laboratory Analysis of a Lavatory Failure. Int'l J. Frac., 23:R57-R60.
8. Connelly, G.M., **Rimnac, C.M.**, Wright, T.M., Hertzberg, R.W. and Manson, J.A. (1984) Fatigue Crack Propagation Behavior of Ultra-High Molecular Weight Polyethylene. J. Orthop. Res., 2:119-125.
9. **Rimnac, C.M.**, Hertzberg, R.W. and Manson, J.A. (1984) Craze Development and Breakdown in PVC During Cyclic Loading. J. Mater. Sci., 14:1116-1124.
10. **Rimnac, C.M.**, Wright, T.M. and McGill, D. (1986) Effect of Centrifugation on the Fracture Properties of Acrylic Bone Cement. J. Bone Joint Surg., 68A:281-287.
11. Ranawat, C.S., Johanson, N.A., **Rimnac, C.M.**, Wright, T.M. and Schwartz, R.E. (1986) Retrieval Analysis of Porous - Coated Components for Total Knee Replacement: A Report of Two Cases. Clin. Orthop. Rel. Res., 210:46-50.
12. **Rimnac, C.M.**, Wright, T.M., Bartel, D.L. and Burstein, A.H. (1986) Failure Analysis of a Total Hip Femoral Component: A Fracture Mechanics Approach. In Case Histories Involving Fatigue and Fracture (ed. by C.M. Hudson and T.P. Rich) ASTM STP 918, pp. 377-388, ASTM, Philadelphia.
13. **Rimnac, C.M.**, Wright, T.M. and Klein, R.W. (1988) J Integral Measurements of Ultra High Molecular Weight Polyethylene. Polym. Engr. Sci., 28:1586-1589.
14. Wright, T. M., **Rimnac, C.M.**, Faris, P.M. and Bansal, M. (1988) Analysis of Surface Damage in Retrieved Carbon Fiber-Reinforced and Plain Polyethylene Tibial Components from Posterior Stabilized Total Knee Replacements. J. Bone Joint Surg., 70A:1312-1319.
15. Wright, T.M., Astion, D.J., Bansal, M., **Rimnac, C.M.**, Green, T., Insall, J.N. and Robinson, R.P. (1988) Failure of Carbon Fiber-Reinforced Polyethylene Total Knee Components: A Report of Two Cases. J. Bone Joint Surg., 70A:926-932.
16. **Rimnac, C.M.**, Wilson, P.D., Jr., Fuchs, M.D. and Wright, T.M. (1988) Acetabular Cup Wear in Total Hip Arthroplasty. In Orthop. Clin. N. Amer., 19:631-636.

17. **Rimnac, C.M.**, Wright, T.M. and Klein, R.W. (1989) The Effect of Waveform on the Fatigue Crack Propagation Behavior of Ultra High Molecular Weight Polyethylene. In Advances in Fracture Research (ed. by K. Salama, K. Ravi-Chandar, D.M.R. Taplin and P. Rama Rao), Pergamon Press, New York, pp. 1305-1311.
18. **Rimnac, C.M.**, Wright, T.M., Bartel, D.L., Klein, R.W. and Petko, A.A. (1991) Failure of Orthopaedic Implants: Three Case Histories. Mat. Charac., 26:201-209.
19. Boyan, B., Boskey, A., **Rimnac, C.**, Fiduman, M., and Liane, J. (1992) Effect of Short-Term Hypomagnesemia on the Chemical and Mechanical Properties of Rat Bone. J. Orthop. Res., 10:774-783.
20. Brien, W.W., Salvati, E.A., Betts, F., Bullough, P., Wright, T., **Rimnac, C.**, Buly, R. and Garvin, K. (1992) Metal Levels in Cemented Total Hip Arthroplasty. Clin. Orthop. Rel. Res., 276:66-74.
21. Wright, T.M., **Rimnac, C.M.**, Stulberg, S.D., Mintz, L., Tsao, A.K., Klein, R.W. and McCrae, C. (1992) Wear of Polyethylene in Total Joint Replacements. Observations from Retrieved PCA Knee Implants. Clin. Orthop. Rel. Res., 276:126-134.
22. **Rimnac, C.M.**, Petko, A.A., Santner, T.J. and Wright, T.M. (1993) The Effect of Temperature, Stress and Microstructure on the Creep of Compact Bovine Bone. J. Biomech., 26:219-228.
23. Bostrom, M.P., Bennett, A.P., **Rimnac, C.M.**, and Wright, T.M. (1994) The Natural History of Ultra High Molecular Weight Polyethylene. Clin. Orthop. Rel. Res., 309:20-28.
24. Huk, O.L., Bansal, M., Betts, F., **Rimnac, C.M.**, Lieberman, J.R., Huo, M.H., and Salvati, E.A. (1994) Polyethylene and Metal Debris Generated by Non-Articulating Surfaces of Modular Acetabular Components. J. Bone Joint Surg. 76B:568-574. (Winner of the 1993 AOA-Zimmer Annual Travel Awards Competition for Orthopaedic Residents and Fellows).
25. **Rimnac, C.M.**, Klein, R.W., Betts, F., and Wright, T.M. (1994) Post-Irradiation Aging of Ultra High Molecular Weight Polyethylene. J. Bone Joint Surg., 76A:1052-1055.
26. Lieberman, J.R., **Rimnac, C.M.**, Garvin, K.L., Klein, R.W., and Salvati, E.A. (1994) An Analysis of the Head-Neck Taper Interface in Retrieved Hip Prostheses. Clin. Orthop. Rel. Res., 300:162-167.
27. **Rimnac, C.M.**, Burstein, A.H., Carr, J.M., Klein, R.W., Wright, T.M., and Betts, F. (1994) Chemical and Mechanical Degradation of UHMW Polyethylene: Report of the Development of an In Vitro Test. J. Appl. Biomater., 5:17-21.
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29. Camacho, N., **Rimnac, C.**, Klein, R., Meyer, R., and Boskey, A. (1995) Altered Mechanical Properties in the Hypophosphatemic Mouse, Bone, 17:271-278.
30. Pruitt, L., Koo, J., **Rimnac, C.M.**, Suresh, S., and Wright, T.M. (1995) Cyclic Compressive Loading Result in Fatigue Cracks in Ultra High Molecular Weight Polyethylene. J. Orthop. Res., 13:143-146.
31. Kurtz, S.M., **Rimnac, C.M.**, Santner, T.J., and Bartel, D.L. (1996) Exponential Model for the Tensile True Stress-Strain Behavior of As-Irradiated and Oxidatively Degraded Ultra High Molecular Weight Polyethylene. J. Orthop. Res., 14:755-761.
32. Massé, P., Coburn, S., Howell, D., Boskey, A., Diah, P., Bennett, A., and **Rimnac, C.** (1996) Biomechanical Properties of Chick Tibial Bone in Pyridoxine Deficiency. Bone, 18:567-574.
33. Astion, D.J., Saluan, P., Stulberg, B.N., **Rimnac, C.M.**, and Li, S. (1996) Metal Backed Acetabular Component Failure: The First Generation Porous Coated Anatomic Acetabulum Experience. J. Bone

34. Kurtz, S.M., **Rimnac, C.M.**, and Bartel, D.L. (1997) Degradation Rate of Ultra-High Molecular Weight Polyethylene. J. Orthop. Res., 15:57-61.
35. Kurtz, S.M., **Rimnac, C.M.**, and Bartel, D.L. (1998) Predictive Model for Tensile True Stress-Strain Behavior of Chemically and Mechanically Degraded Ultrahigh Molecular Weight Polyethylene. J. Biomed. Mater. Res. (Appl. Biomat.) 43:241-248.
36. Kurtz, S.M., Bartel, D.L., and **Rimnac, C.M.** (1998) Postirradiation Aging Affects Stress and Strain in Polyethylene Components. Clin. Orthop. Rel. Res., 350:209-220.
37. Dean, D., Topham, N., **Rimnac, C.**, Mikos, A., Goldberg, D., Jepsen, K., Redtfeldt, R., Pennington, D., Ratcheson, R. (1999) Osseointegration of Preformed PMMA Craniofacial Prostheses Coated with Bone Marrow Impregnated Poly(DL-Lactic-co-Glycolic Acid) Foam. Plast. Reconstruc. Surg. 104:705-12.
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39. Krzypow, D.J., **Rimnac, C.M.** (2000) Cyclic Steady-State Stress-Strain Behavior of UHMW Polyethylene. Biomaterials, 21:2081-2087.
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41. Akkus, O., Jepsen, K.J., **Rimnac, C.M.** (2000) Microstructural Aspects of the Fracture Process in Human Cortical Bone. J. Mater. Sci., 35:1-10.
42. Kurtz, S.M., **Rimnac, C.M.**, Pruitt, L., Jewett, C.W., Goldberg, V.M., Edidin, A. A. (2000) The Relationship Between the Clinical Performance and Large Deformation Behavior of Retrieved Tibial Inserts. Biomaterials. 21:283-291.
43. Edidin, A.A., **Rimnac, C.M.**, Goldberg, V.M., Kurtz, S.M. (2001) Mechanical Behavior, Wear Surface Morphology, and Clinical Performance of UHMWPE Acetabular Components After 10 Years of Implantation. Wear, 8768:1-7.
44. Akkus, O. and **Rimnac, C.M.** (2001) Fracture Resistance of Gamma Radiation Sterilized Cortical Bone Allografts. J. Orthop. Res., 19:927-943.
45. Akkus, O. and **Rimnac, C.M.** (2001) Cortical Bone Tissue Resists Fatigue Fracture by Deceleration and Arrest of Microcrack Growth. J. Biomech., 34:757-764.
46. Wolfe, M.S., Dean, D., Chen, J.E., Fisher, J., Han, S., **Rimnac, C.**, Caplan, A., Solchaga, L., Mikos, A.G. (2002) In Vitro Degradation and Fracture Toughness of Multilayered Porous Poly(Propylene Fumarate)/ β -tricalcium Phosphate Scaffolds. J. Biomed. Mater. Res., 61:159-164.
47. Bergström, J.S., Kurtz, S.M., **Rimnac, C.M.**, Edidin, A.A. (2002) Constitutive Modeling of Ultra-High Molecular Weight Polyethylene Under Large-Deformation and Cyclic Loading Conditions. Biomaterials, 23:2329-2343.
48. Kurtz, S.M., Villarraga, M.L., Herr, M.P., Bergstrom, J., **Rimnac, C.M.**, Edidin, A.A. (2002) Thermomechanical Behavior of Virgin and Highly Crosslinked Ultra-High Molecular Weight Polyethylene used in Total Joint Replacements. Biomaterials, 23:3681-3697.

49. Cooke, M.C., Fisher, J., Dean, D., **Rimnac, C.**, and Mikos, A.G. (2002) Control of 3D Biodegradable Scaffold Geometry. J. Biomed. Mater. Res. Part B: Appl. Biomater., 64B:65-69.
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51. Kurtz, S.M., Turner, J., Herr, M., Edidin, **Rimnac, C.M.** (2003): Assessment of Surface Roughness and Waviness Using White Light Interferometry for Short-Term Implanted, Highly Crosslinked Acetabular Components. In Highly Crosslinked and Thermally Treated Ultra-High Molecular Weight Polyethylene For Joint Replacements (ed, by S.M. Kurtz, R. Gsell and J. Martell), ASTM STP 1445, ASTM West Conshohocken.
52. Akkus, O., Knott, D.F., Jepsen, K.J., Davy, D.T., **Rimnac, C.M.**: The Relationship Between Damage Accumulation and Mechanical Property Degradation in Cortical Bone: Microcrack Orientation is Important. J. Biomed. Mater. Res. 65A:482-488, 2003.
53. Dean, D., Topham, N.S., Meneghetti, S.C., Wolfe, M.S., Jepsen, K., He, S., Chen, J.E.-K., Fisher, J.P., Cooke, M., **Rimnac, C.**, Mikos, A.G. (2003) Poly (Propylene Fumarate) as a Scaffold in Solid and Foam Composite Tissue Engineered Constructs for Cranial Reconstruction. Tissue Engineering, 9:495-504.
54. Gencur, S.J., **Rimnac, C.M.**, Kurtz, S.M. (2003) Failure Micromechanisms During Uniaxial Tensile Fracture of Conventional and Highly Crosslinked Ultra-High Molecular Weight Polyethylene used in Total Joint Replacements. Biomaterials, 24:3947-3954.
55. Kurtz, S.M., Hozack, W., Marcolongo, M., Turner, J., **Rimnac, C.**, Edidin, A. (2003) Degradation of Mechanical Properties of UHMWPE Acetabular Liners Following Long-Term Implantation. Journal of Arthroplasty, 218(7 Suppl 1):68-78.
56. Collier, M.B., Kraay, M.J., **Rimnac, C.M.**, Goldberg, V.M. (2003) Critical Evaluation of Contemporary Software Methods for Quantifying Polyethylene Wear Following Total Hip Arthroplasty. J. Bone Joint Surg., 85A:2410-2418.
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69. Dean, D., Wolfe, M.S., Ahmad, Y., Totonchi, A., Chen, J.E.-K., Fisher, J.P., Cooke, M.N., **Rimnac, C.M.**, Lennon, D.P., Caplan, A., Topham, N.S., Mikos, A.G. (2005) Effect of Transforming Growth Factor β_2 on Marrow-Infused Foam Poly(Propylene Fumarate) Tissue-Engineered Constructs for the Repair of Critical-Size Cranial Defects in Rabbits. Tissue Engineering, 11:923-939.
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