

# Curriculum Vitae and Bibliography

## Matthew T Drake, MD, PhD

### Personal Information

Citizenship: United States of America  
Work Address: Mayo Clinic Rochester  
200 First St SW  
Rochester, MN 55905-0001  
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### Present Academic Rank and Position

**Consultant** - Division of Endocrinology, Diabetes, Metabolism, Nutrition, Department of Internal Medicine, Mayo Clinic, Rochester, Minnesota 12/22/2010 - Present  
**Teaching/Examining Privileges in Clinical & Translational Science** - Mayo Clinic Graduate School of Biomedical Sciences, Mayo Clinic College of Medicine and Science 07/31/2013 - Present  
**Associate Professor of Medicine** - Mayo Clinic College of Medicine and Science 02/01/2015 - Present  
**Consultant (Joint Appointment)** - Division of Hematology, Department of Internal Medicine, Mayo Clinic, Rochester, Minnesota 03/22/2017 - Present  
**Master's Faculty Privileges in Clinical & Translational Science** - Mayo Clinic Graduate School of Biomedical Sciences, Mayo Clinic College of Medicine and Science 03/31/2020 - Present

### Education

Harvard College - AB, Biology 1989 - 1993  
Washington University - MD/PhD, Medicine Molecular and Cell Biology 1994 - 2001  
Duke University Medical Center - Resident, Internal Medicine/Endocrinology 2001 - 2004  
Duke University Medical Center - Clinical Research Fellowship, Postdoctoral Fellow 2004 - 2006  
Mayo School of Graduate Medical Education, Mayo Clinic College of Medicine - Clinical Research Fellowship, Endocrinology 2006 - 2007  
Endocrinology, Programs in Rochester, Mayo School of Graduate Medical Education, Mayo Clinic College of Medicine, Rochester, Minnesota - Resident 10/28/2006 - 10/26/2007

### Additional Education

European Calcified Tissue Society Training Workshop: Cancer and Bone - A guide for in vivo experiments 2012 - Present  
University of L'Aquila, Department of Biotechnological and Applied Clinical Sciences, L'Aquila, Italy  
National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) Forum for Clinical Mentored K Awardees 2012 - Present  
National Institutes of Health, Bethesda, Maryland

### Certification

#### Board Certifications

##### American Board of Internal Medicine (ABIM)

Internal Medicine 2004 - 2014  
Endocrinology, Diabetes, and Metabolism 2007 - 2027

#### Other Certifications

##### Mayo Clinic Quality Academy

Mayo Clinic Quality Fellow: Bronze Level Certification 2011

**Licensure**

Minnesota	49132 (Medical)	2006 - Present
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**Honors and Awards**

<b>Magna Cum Laude, A.B. in Biology</b> - Harvard College	1993
<b>Summa Cum Laude Thesis</b> - Harvard College	1993
<b>Fellowship</b> - Foundation Jean Dausset - CEPH	1993 - 1994
<b>Medical Scientist Training Program</b> - Washington University School of Medicine	1994 - 2001
<b>Physician Scientist Training Program</b> - Washington University School of Medicine	2001
<b>Clinical Investigator Pathway</b> - Multi-Specialty MOC Portfolio Program: Clinical Investigator Pathway, American Board of Medical Specialties	2001 - 2007
<b>Young Investigator Award</b> - American Society for Bone and Mineral Research	2009
<b>New Investigator Award</b> - Mayo Clinic Department of Medicine	2010
<b>Outstanding Editorial Board Member</b> - Journal of Bone and Mineral Research	2019

**Previous Professional Positions and Major Appointments**

<b>Senior Associate Consultant</b> - Division of Endocrinology, Diabetes, Metabolism, Nutrition, Department of Internal Medicine, Mayo Clinic, Rochester, Minnesota	10/27/2007 - 12/21/2010
<b>Assistant Professor of Medicine</b> - Mayo Clinic College of Medicine and Science	06/01/2008 - 01/31/2015
<b>Teaching/Examining Privileges of Clinical &amp; Translational Science</b> - Mayo Clinic Graduate School of Biomedical Sciences, Mayo Clinic College of Medicine and Science	07/31/2013 - 03/30/2020

**Service****Community Memberships and Services**

American Board of Internal Medicine - Endocrine Examination Committee Member	2018 - Present
American Society for Bone and Mineral Research Program Committee Member, Therapeutic Advances in Rare Skeletal Diseases	2017
Endocrine Society Annual Meeting Steering Committee - Bone and Mineral Team Leader	2016 - 2019
Annual Meeting Abstract Reviewer	2018 - 2020
Fibrous Dysplasia Foundation Scientific Advisory Board	2020 - Present
Orthopaedic Research Society (ORS) Advisory Board Member	2017 - 2020
Rare Bone Disease Alliance Scientific Advisory Board	2016 - Present
Soft Bones Foundation Scientific Advisory Board	2012 - Present

**Professional Memberships and Societies****Professional Memberships and Services**

Advances in Mineral Metabolism Member	2007 - Present
Board of Directors Board Member	2014 - 2017
American Society for Bone and Mineral Research Member	2004 - Present

Mentor, Networking Breakfast	2014 - 2016
Chair, Harold Frost Young Investigator Award Review Committee	2017
Scientific Reviewer, Rising Star Awards	2018 - 2020
Member, Annual Meeting Program Advisory Committee	2019 - Present
American Society for Bone and Mineral Research Ethics Advisory Committee Member	2018 - 2019
American Society for Bone and Mineral Research, Rare Bone Disease Working Group Chair	2016 - 2017
American Society for Bone and Mineral Research Abstract Selection Committee Reviewer	2010 - 2018
Cancer and Bone Session Chair	2011
Grants in Aid Program (GAP) Grant Application Reviewer	2014
Osteoporosis Pathophysiology Session Chair	2012
Professional Practice Committee Member	2011 - 2014
Task Force on Cell Based Therapies Independent Content Reviewer	2014 - 2020
Task Force on Managing Osteoporosis Patients after Long-Term Bisphosphonate Treatment	2013 - 2016
American Society of Hematology Member	2009 - Present
Endocrine Society Member	2004 - Present
Member, Endocrine Facts and Figures Bone Working Group	2014 - 2015
Co-chair, Clinical Practice Guideline Committee for Hypercalcemia of Malignancy	2018 - Present
Task Force on Osteoporosis in Men Member	2011 - 2012
International Bone and Mineral Society Member	2007 - Present
International Myeloma Society Member	2010 - Present
Abstract Review Committee	2017
International Myeloma Working Group Member	2009 - Present
Minnesota Medical Association Member	2006 - Present
Zumbro Valley Medical Society Member	2006 - Present

### Study Sections

Department of Defense Congressionally Directed Medical Research Program Scientific Reviewer	2010 - 2012
Scientific Reviewer, Fibrous Dysplasia Peer Review Panel	2020
European Society for Alcohol Research	

Scientific Reviewer	2015
National Institutes of Health	
Ad hoc Scientific Reviewer, National Institute on Aging	2016 - 2017
National Institutes of Health	
Ad hoc Scientific Reviewer, National Institute of Diabetes and Digestive and Kidney Diseases	2013 - 2015
Ad hoc Scientific Reviewer, Neurological, Aging and Musculoskeletal Epidemiology Study Section	2020
Netherlands Organization for Scientific Research	
Scientific Reviewer	2018

## Journal Responsibilities

### Journal Editorial Responsibilities

Bone	
Guest Editor - Sclerostin	2015 - 2017
Editorial Board Member	2016 - Present
Editor	2017 - Present
Current Osteoporosis Reports	
Guest Editor - Osteoporosis and Cancer	2015 - 2016
JBMR Plus	
Editorial Board Member	2017 - Present
Journal of Bone and Mineral Research	
Editorial Board Member	2015 - 2019
Journal of Clinical and Translational Endocrinology: Case Reports	
Editorial Board Member	2014 - 2019
Journal of Clinical Endocrinology & Metabolism	
Editorial Board Member	2013 - 2016
Mayo Clinic Proceedings	
Section Editor - Endocrinology	2016 - Present

### Journal Other Responsibilities

American Journal of Hematology	
Ad Hoc Reviewer	
Archives of Internal Medicine	
Ad Hoc Reviewer	
Blood	
Ad Hoc Reviewer	
Blood Cancer Journal	
Ad Hoc Reviewer	
Cancer	
Ad Hoc Reviewer	
Endocrine Reviews	
Ad Hoc Reviewer	
European Journal of Hematology	
Ad Hoc Reviewer	
JAMA Oncology	
Ad Hoc Reviewer	
Journal of Clinical Oncology	
Ad Hoc Reviewer	
Journal of Clinical Pharmacology	
Ad Hoc Reviewer	

Leukemia  
Ad Hoc Reviewer

Leukemia & Lymphoma  
Ad Hoc Reviewer

Leukemia Research  
Ad Hoc Reviewer

Molecular and Cellular Endocrinology  
Ad Hoc Reviewer

Nature Reviews - Endocrinology  
Ad Hoc Reviewer

Nature Reviews Rheumatology  
Ad Hoc Reviewer

New England Journal of Medicine  
Ad Hoc Reviewer

Osteoporosis International  
Ad Hoc Reviewer

PLoS ONE  
Ad Hoc Reviewer

Proceedings of the National Academy of Sciences  
Ad Hoc Reviewer

The Lancet  
Ad Hoc Reviewer

The Lancet Diabetes & Endocrinology  
Ad Hoc Reviewer

## Education Interests and Accomplishments

### Curriculum and Course Development

Mayo Clinic Endocrine Grand Rounds  
Director 08/2012 - 08/2013

### Teaching

Endocrine Fellowship Journal Club  
Faculty Advisor 2014 - Present

Endocrine Fellowship Clinical Conference  
Faculty Advisor 2014 - Present

Mayo Medical School - Bone and Mineral Metabolism Course  
Lecturer 2015 - 2020

Endocrine Fellowship Case Discussion  
Faculty Advisor 2015 - Present

Histomorphometry - The Basics  
Lecturer 2016 - Present

Mayo Clinic Endocrine Fellowship

Osteoporosis - Part I  
Lecturer 2017 - Present

Mayo Clinic Endocrine Fellowship

Osteoporosis - Part II  
Lecturer 2017 - Present

Mayo Clinic Endocrine Fellowship

Cancer and Skeletal Health  
Lecturer 2019 - Present

Mayo Clinic Endocrine Fellowship

**Mentorship**

Ng, Alvin (Postdoctoral Fellow) <b>Description:</b> <b>Current Status:</b> Physician/Scientist, Singapore General Hospital <b>Outcome:</b>	03/2008 - 05/2009
Nicks, Kristy (Postdoctoral Fellow) <b>Description:</b> <b>Current Status:</b> Program Director, Bone Biology, Metabolic Bone Disorders, and Osteoporosis Program, National Institute of Arthritis and Musculoskeletal and Skin Diseases <b>Outcome:</b>	07/2010 - 06/2015
Zhang, Wei (Postdoctoral Fellow) <b>Description:</b> <b>Current Status:</b> Registered Nurse, Mayo Clinic <b>Outcome:</b>	09/2010 - 03/2014
Elraiyah, Tarig (Postdoctoral Fellow) <b>Description:</b> <b>Current Status:</b> Fellowship, Geriatric Medicine, Michigan <b>Outcome:</b>	02/2012 - 06/2014
Quan, Jinxing (Postdoctoral Fellow) <b>Description:</b> <b>Current Status:</b> Physician, Lanzhou, Gansu Province, China <b>Outcome:</b>	02/2014 - 03/2016
Kumar, Swarup (Postdoctoral Fellow) <b>Description:</b> <b>Current Status:</b> Predoctoral Associate, The Jackson Laboratory <b>Outcome:</b>	07/2014 - 06/2015
Warad, Deepti (Clinical Faculty) <b>Description:</b> <b>Current Status:</b> Senior Associate Consultant, Mayo Clinic Division of Pediatric Hematology <b>Outcome:</b>	01/2015 - Present
Sfeir, Jad (Clinical Fellow) <b>Description:</b> <b>Current Status:</b> Senior Associate Consultant, Mayo Clinic Division of Endocrinology <b>Outcome:</b>	07/2016 - Present
Bedatsova, Lucia (Medical Student) <b>Description:</b> <b>Current Status:</b> Internal Medicine Resident, Lausanne, Switzerland <b>Outcome:</b>	06/2018 - 04/2019

**Institutional/Departmental Administrative Responsibilities, Committee Memberships and Other Activities****Mayo Clinic**

American Society for Bone and Mineral Research Publications Committee Working Group for Investigating Reports of Scientific Misconduct in Published Articles Member	2019
Center for Clinical and Translational Science (CCaTS) Scientific Review Committee Reviewer	2016 - Present
Data Safety Monitoring Board - Mayo Clinic Phase 2 COVID-19 and Fisetin Study Chair	2020 - Present
Geriatric Medicine and Gerontology Research Committee Member	2019 - Present
Mayo Clinic Center for Translational Science Activities Associate Member	2008 - Present

Mayo Clinic Committees	
Institutional Review Board	
Board Member	2011 - Present
Mayo Clinic Kogod Center of Aging - Innovation in Aging Research Award	
Reviewer	2018 - 2019
<b>Mayo Clinic in Rochester</b>	
Department of Internal Medicine	
Division of Endocrinology, Diabetes, Metabolism, Nutrition	
Executive Committee, National Institutes of Health T32 Training Grant	2015 - Present
Career Development Award Review Committee	
Reviewer and Member	2014 - Present
Master's Thesis Defense Committee	
Member, Kristy Nicks, Ph.D	2014 - 2015
Chair, Jad Sfeir, M.D.	2019 - 2021
Division of Endocrinology, Diabetes and Metabolism	
Fellowship Selection Committee	
Member	2014 - Present
Hospital Core Group	
Member	2007 - Present
Metabolic Bone Disease Core Group	
Member	2007 - Present
Chair	2015 - Present
Mayo Clinic Comprehensive Metabolomics Resource Core (MCCMRC)	
Grant Reviewer	2014
Mayo Clinic Rochester Committees	
Institutional Review Board	
Executive Committee	
Member	2018 - Present
Radiation Safety Committee	
Vice Chair	2014 - 2017
Mayo Pharmaceutical Formulary Committee General Medicine/Surgery Task Force	
Member	2020 - Present

### Activities at Other Institutions

American Society for Bone and Mineral Research	
Chair, Professional Practice Committee	2019 - Present
Food and Drug Administration (FDA)	
Member, Bone, Reproductive and Urologic Drugs Advisory Committee	2015 - Present

### Presentations Extramural

#### National or International

##### Invited

Effects of Intermittent Parathyroid Hormone Treatment on Osteoprogenitor Cells in Postmenopausal Women 4th Bone Research Seminar Tokyo, Japan	2010
Optimizing Bone-Related and Anti-Tumor Properties of Bisphosphonates for Patients with Multiple Myeloma. Lymphoma & Myeloma Congress New York, New York	2010
Measurement of Sclerostin and DKK-1 in Serum: What Insights Has This Provided? European Calcified Tissue Society	2012

Stockholm, Sweden	
Circulating Sclerostin as a Marker of Bone Health and Disease Plenary Symposium American Society for Bone and Mineral Research Annual Meeting	2013
Bone Mineral Metabolism in Chronic Kidney Disease Nephrology Update - West Lake Forum Hangzhou, China	2014
Monoclonal Gammopathy Associated Bone Loss Dresden University Medical Center Dresden, Germany	2014
Controversies in Pharmaceutical Management of Osteoporosis Therapy American Association of Clinical Endocrinologists Annual Meeting	2014
<b>Oral</b>	
Bisphosphonates and Bone Health Mayo Clinical Reviews: Internal Medicine Update	2008
Impact of vitamin D deficiency on the clinical presentation and prognosis of patients with newly diagnosed multiple myeloma Advances in Mineral Metabolism Annual Meeting	2009
Effects of Intermittent PTH Treatment on Gene Expression in Vivo in Osteoblast Progenitor Cells in Bone Marrow of Postmenopausal Women American Society for Bone and Mineral Research Annual Meeting	2009
Increases in Serum DKK1 are Associated with Alterations in Skeletal Microstructure in Monoclonal Gammopathy of Undetermined Significance (MGUS) American Society for Bone and Mineral Research Annual Meeting	2009
Predicting Fracture Risk Mayo Clinical Reviews: Internal Medicine Update	2009
Intermittent PTH Treatment Decreases Circulating Sclerostin Levels in Postmenopausal Women American Society for Bone and Mineral Research Annual Meeting	2010
Suppression of FSH in Postmenopausal Women has No Effect on Bone Resorption Markers American Society for Bone and Mineral Research Annual Meeting	2010
Bone Turnover Markers Mayo Clinic Endocrine Course - Mallorca Mallorca, Spain	2012
Skeletal Health in Cancer Patients Mayo Clinic Endocrine Course - Mallorca Mallorca, Spain	2012
Osteoporosis in Men Endocrine Society Annual Meeting San Francisco, California	2013
The Clinical Spectrum of Hypophosphatasia Soft Bones Patient Education Meeting San Diego, California	2014
Bone Loss in Monoclonal Gammopathy of Undetermined Significance. Advances in Mineral Metabolism Annual Meeting	2014
<b>Regional</b>	
<b>Invited</b>	
Current Issues in Osteoporosis: Long-term Complications of Bisphosphonates and Use of Denosumab Annual Midwest Regional American Association of Clinical Endocrinologists Meeting	2010
Improving Quality of Care in the Treatment of Patients with Osteoporosis Northern Michigan Regional Hospital Grand Rounds Petoskey, Michigan	2010



Vitamin D Deficiency States: Detection and Treatment Strategies Mayo Clinic Health Solutions Disease Management Continuing Education	2010
Understanding Bone Disease Across the Monoclonal Gammopathy Spectrum University of Arkansas Medical Sciences Winthrop P. Rockefeller Cancer Institute Grand Rounds	2011
Skeletal Health Across the Monoclonal Gammopathy Spectrum Washington University School of Medicine St. Louis, Missouri	2011
Skeletal Structural Changes and Fracture Risk in Monoclonal Gammopathy of Undetermined Significance Central Society for Clinical and Translational Research Annual Meeting Chicago, Illinois	2014
<b>Oral</b>	
Parathyroid Hormone: From Basic Biology to Clinical Practice Mayo Clinic Endocrine Grand Rounds	2008
Cancer Associated Bone Disease Mayo Clinic Endocrine Grand Rounds	2009
Alterations in skeletal microstructure in MGUS are associated with increases in serum levels of Dickkopf1 and macrophage inflammatory protein 1-alpha Mayo Clinic Endocrine Research Seminar	2010
Management of Bone Disease in Multiple Myeloma International Myeloma Foundation Patient & Family Seminar Portland, Oregon	2010
Management of Bone Disease in Multiple Myeloma International Myeloma Foundation Patient & Family Seminar Redwood City, California	2011
Suppression of FSH in postmenopausal women has no effect on bone resorption markers Mayo Clinic Endocrine Grand Rounds	2011
Management of Bone Disease in Multiple Myeloma International Myeloma Foundation Patient & Family Seminar Dallas, Texas	2011
Optimizing Bone Health in Multiple Myeloma International Myeloma Foundation Patient & Family Seminar Boston, Massachusetts	2012
Optimizing Bone Health in Multiple Myeloma International Myeloma Foundation Patient & Family Seminar Philadelphia, Pennsylvania	2013
Monoclonal gammopathy-associated bone loss Mayo Clinic Kogod Center on Aging - New and Exciting Research Developments	2013
Optimizing Bone Health in Multiple Myeloma International Myeloma Foundation Patient & Family Seminar Atlanta, Georgia	2014
<b>Unclassified</b>	
Cancer Associated Bone Loss and How to Manage It Northern California Institute for Bone Health Annual Meeting	2014
Sclerostin Measurement in Health and Disease Northern California Institute for Bone Health Annual Meeting	2014
Sclerostin: A Bone Turnover Marker? American Society for Bone and Mineral Research Annual Meeting - Bone Turnover Markers Working Group	2014
Living Well with Myeloma: Management of Bone Disease International Myeloma Foundation	2014
Antiresorptive Therapy: When is the Holiday Over?	2015

Mayo Clinic Endocrine Course - Cancun, Mexico	
Hypophosphatasia Mayo Clinic Endocrine Course - Cancun, Mexico	2015
New Tools to Predict Fracture Risk Mayo Clinic Endocrine Course - Cancun, Mexico	2015
What's New in Bone and Calcium? Florida Endocrine Society Annual Meeting	2015
Bone Health in Patients with Bone Marrow Cancers Plenary Symposium II - Bone Health in Patients Treated for Cancer American Society for Bone and Mineral Research Annual Meeting	2015
Reversible Hypoparathyroidism in Riedel's Thyroiditis Advances in Mineral Metabolism Annual Meeting	2015
Skeletal Biomarkers Associated with Aging and Estrogen Deficiency Revealed By RNA Sequencing Endocrine Society Annual Meeting	2015
Monoclonal Gammopathy Associated Bone Loss Tokyo Medical and Dental University	2015
Assessment of Bone Disease in Monoclonal Gammopathies Mayo Clinic - Advancing Myeloma Care in Developing Countries	2016
Bone Marrow Cancers and Bone Health International Congress of Endocrinology/Annual Meeting of the Chinese Society of Endocrinology	2016
Interactions of Bone and Muscle with Aging International Congress of Endocrinology/Annual Meeting of the Chinese Society of Endocrinology	2016
Mechanisms Underlying Bone Loss and Fracture Risk with Aging, Diabetes, and MGUS Hospital for Special Surgery - Metabolic Bone Disease Grand Rounds	2016
Monoclonal Gammopathy Associated Bone Disease - Is It Time to Rename MGUS?	2016
Mayo Clinic Endocrine Research Seminar	
Amiodarone and the Thyroid – What the Cardiologist Should Know International Clinical Cardiology Course - Vina del Mar, Chile	2016
Calcium Supplementation for Skeletal Health: Effects on Cardiovascular Disease Risk International Clinical Cardiology Course - Vina del Mar, Chile	2016
Cancer and Bone Health Mayo Clinic Endocrine Course - South Beach, Florida	2017
Career Advice for Bone Researchers Osteologie 2018 - Dresden	2018
MGUS, Myeloma, and Bone Health Osteologie 2018 - Dresden	2018
Vitamin D and Cancer French - American Meeting in Endocrinology	2018
Hypophosphatasia - The Overview Inaugural Soft Bones Scientific Symposium	2018
Bone Health: Prevention of Osteoporosis and Fractures Living Well with Prostate Cancer – Mayo Clinic Patient Education Symposium	2018
Meet the Professor: Effects of Cancer on the Skeleton American Society for Bone and Mineral Research	2018
Management of Myeloma Bone Disease and Other Supportive Care Strategies International Myeloma Society Educational Workshop	2018
Osteoporosis in Older Adults with Monoclonal Gammopathies American Society of Hematology Scientific Workshop on Hematology and Aging	2018

Clinical Aspects of Bone Disease Across the Monoclonal Gammopathy Spectrum Bone Disease Program of Texas Bone Seminar Series	2019
Understanding Non-Invasive Measures of Bone Microarchitecture Endocrine University	2019
The Osteoporotic Patient: Medical Management Strategies and Potential Complications of Pharmacologic Treatments Mayo Clinic Community Internal Medicine Conference	2019
Medical Approaches to Optimizing Bone Health in Spine Surgery Patients Mayo Clinic Orthopedic Spine Surgery/Neurosurgery Conference	2020
Monoclonal Gammopathy of Skeletal Significance Italian Society of Osteoporosis and Metabolic Bone Diseases (SIOMMMS)	2020
Osteoporosis Therapy: Forever is a Long Time... Mayo Clinic Endocrine Course - San Juan	2020
X-Linked Hypophosphatemia Mayo Clinic Endocrine Course - San Juan	2020
Treating Patients with Osteoporosis During the COVID-19 Pandemic ASBMR Webinar Panel	2020
COVID-19 and Bone Health American Society for Bone and Mineral Research Annual Meeting	2020
Bone Health and the Prevention of Future Fractures: Challenges of Referrals and Treatment Fragility Fracture Network Pre-Congress Regional Meeting	2021
COVID-19 Vaccination and Osteoporosis Management ASBMR Webinar Panel	2021
New and Current Therapeutic Approaches in Bone Metastases and Multiple Myeloma European Calcified Tissue Society 2021 Digital Congress	2021
Optimization of Bone Health in MGUS, Smoldering and Multiple Myeloma Washington University Division of Bone and Mineral Diseases Grand Rounds	2021
Updates in Skeletal Aging Mayo Clinic Division of Geriatric Medicine and Gerontology Grand Rounds	2021
Supportive Care in Multiple Myeloma - Bone Disease Mayo Clinic Workshop in Plasma Cell Disorders: Robert Kyle Symposium	2021
Drugs Used to Treat Osteoporosis in MGUS and Myeloma National Osteoporosis Foundation/Interdisciplinary Symposium on Osteoporosis	2021

## Visiting Professorship

### Visiting Professorships

Dresden Center for Regenerative Therapies Monoclonal Gammopathy-Associated Bone Loss	2014 - Present
Memorial Sloan-Kettering Cancer Center Endocrinology Grand Rounds Visiting Professor	2014 - Present
University of California San Diego Division of Endocrinology The Evaluation and Management of Hypophosphatemic Disorders	2018 - Present

## Clinical Practice, Interests, and Accomplishments

Disorders of skeletal and mineral metabolism. Cancer-associated bone loss.

## Research Interests and Accomplishments

Mechanisms underlying, and skeletal architectural changes occurring with, age-related bone loss. Mechanisms of skeletal metastasis and malignancy-associated bone loss.

## Research Grants Awarded

**Active Grants****Federal**

Program Director / Principal Investigator	Role of senescence in multiple myeloma tumorigenesis. Funded by National Institute on Aging. (U01 AG 75227)	06/2022 - 05/2026
Co-Investigator	Beta1-selective blockade for prevention of postmenopausal bone loss: A randomized controlled trial . Funded by National Institute on Aging. (R01 AG 65154)	01/2021 - 12/2025

**Federal sub award**

Program Director / Principal Investigator	Prevention of Fractures in Patients with Parkinson's Disease (TOPAZ). Funded by National Institute on Aging. (AG 59417 P-167)	03/2021 - 02/2024
Co-Investigator	Therapy-induced senescence in multiple myeloma plasma cells. Funded by National Cancer Institute. (CA 186781)	09/2022 - 08/2023

**Industry**

Co-Investigator	Prevalence of Hypophosphatasia in Patients with Fibromyalgia at the Mayo Clinic . Funded by Alexion Pharmaceuticals, Inc.	05/2017 - 04/2019
Co-Investigator	Amendment #3 A Randomized, Double-Blind, Placebo-Controlled, Single-Administration, Dose-Escalation Study of Entolimod on Immunosenescence in Healthy Geriatric Subjects Receiving Influenza Vaccination . Funded by Genome Protection, Inc.. (Entolimod (CBLB502))	09/2019 - 09/2022
Co-Investigator	Am #1   A Phase 2 Twopart Placebocontrolled Parallelgroup Doubleblind Study to Assess the Efficacy and Safety of 2 Dosage Regimens of Oral IPN60130 for the Treatment of Fibrodysplasia Ossificans Progressiva in Male and Female Participants 5 years of Age. Funded by Ipsen Pharmaceutical. (D-CA-60130-452)	03/2022 - 02/2025
Co-Investigator	A Phase 2, Randomized, Double-Blind, Placebo-Controlled Study to Evaluate the Efficacy, Safety, and Tolerability of INCB000928 in Participants With Fibrodysplasia Ossificans Progressiva. Funded by Incyte. (INCB 00928-201)	09/2022 - 09/2024
Others	Amendment #1 Replacement: A Phase 3, Efficacy and Safety Study of Oral Palovarotene for the Treatment of Fibrodysplasia Ossificans Progressiva (FOP). Funded by Clementia Pharmaceutical. (PVO-1A-301)	05/2018 - 05/2023

**Completed Grants****Federal**

Program Director / Principal Investigator	Pathogenesis of Monoclonal Gammopathy Bone Disease. Funded by National Institute of Arthritis and Musculoskeletal and Skin Diseases. (K08 AR 59138)	08/2010 - 07/2015
Co-Investigator	Prevalence and Progression of Monoclonal Gammopathies. Funded by National Cancer Institute. (R01 CA 107476)	03/2009 - 04/2014
Co-Investigator	Physiology of Bone Metabolism in an Aging Population. Funded by National Institute on Aging. (P01 AG 04875)	07/2009 - 06/2014
Co-Investigator	Canonical and noncanonical Wnt signaling in osteoclast functions. Funded by National Institute of Arthritis and Musculoskeletal and Skin Diseases. (R01 AR 65402)	06/2015 - 05/2021
Co-Investigator	Physiology of Bone Metabolism in an Aging Population. Funded by National Institute on Aging. (P01 AG 04875)	06/2015 - 04/2021
Co-Investigator	Osteoclast Regulation of Bone Formation. Funded by National Institute of Arthritis and Musculoskeletal and Skin Diseases. (R01	07/2015 - 06/2021

AR 67129)

Co-Investigator Epidemiology of Age-Related Bone Loss and Fractures. Funded by National Institute of Arthritis and Musculoskeletal and Skin Diseases. (R01 AR 27065) 06/2016 - 05/2022

**Federal sub award**

Program Director / Principal Investigator Risk Factors for MGUS Progression (MCA Multiple Myeloma SPORE). Funded by National Cancer Institute. (CA 186781) 09/2015 - 08/2016

Program Director / Principal Investigator Prevention of Fractures in Patients with Parkinson's Disease. Funded by National Institute on Aging. (AG 59417) 09/2018 - 02/2020

**Foundation**

Principal Investigator Multiple Myeloma and Bone: Understanding the Destruction. Funded by Multiple Myeloma Research Foundation 09/2007 - 08/2008

Co-Investigator Assessment of fracture risk with radiologic bone mineral densities and serological markers in children and young adults with bleeding disorders. Funded by Hemostasis & Thrombosis Research Society 07/2018 - 12/2020

Co-Investigator Assessment of Cortical and Cancellous Bone In Cross Sex Hormone Therapy In Transgender Individuals. Funded by Endocrine Fellows Foundation 11/2020 - 10/2021

**Industry**

Program Director / Principal Investigator Bimagrumb in patients after surgical treatment of hip fracture. Funded by Novartis. (CBYM338D2201) 11/2015 - 11/2017

Co-Investigator A 29 week, randomized, double-blind, placebo-controlled, multi-center, parallel group dose range finding study to assess the effect of monthly doses of bimagrumb 70, 210 and 700 mg on skeletal muscle strength and function in older adults with Sarcopenia . Funded by Novartis. (Protocol BYM338E2202) 09/2014 - 02/2016

Co-Investigator Resubmission\_Amendment #2: A Phase 1b Study to Assess the Anti-fatigability Effect of CK-2127107 in Elderly Male and Female Subjects with Limitations in Mobility. Funded by Astellas Pharma Global Development, Inc. (APGD). (3318-CL-3001) 05/2017 - 11/2018

Co-Investigator Amendment #1 A Randomized, Double-Blind, Placebo-Controlled, Single-Administration, Dose-Escalation Study of Entolimod on Immunosenescence in Healthy Geriatric Subjects Receiving Influenza Vaccination . Funded by Genome Protection, Inc.. (Entolimod (CBLB502)) 09/2019 - 09/2021

**Mayo Clinic**

Principal Investigator Molecular Basis for Bone Destruction in Multiple Myeloma. Funded by Mayo Career Development Award Funding 01/2007 - 12/2009

Principal Investigator Testosterone Levels and Sexual Function in Women. Funded by Mayo Clinical and Translational Science Award Small Grants Award 03/2008 - 02/2009

Principal Investigator Bone Microarchitecture at the Ultra-Distal Radius in Monoclonal Gammopathy of Undetermined Significance and Multiple Myeloma. Funded by Mayo Hematologic Malignancies Program 03/2008 - 02/2010

Program Director / Principal Investigator Pathogenesis of Monoclonal Gammopathy Bone Disease. Funded by Early Career Supplement Award 07/2010 - 06/2012

Co-Investigator	Bisphosphonate-Related Insufficiency Fractures. Funded by SGP - Small Grants Program <\$10K	01/2009 - 12/2009
Co-Investigator	Pilot Study of Teriparatide for Postsurgical Hypoparathyroidism - SGP. Funded by SGP - Small Grants Program <\$10K	07/2010 - 07/2012
Co-Investigator	Measurement of Semaphorin 3A and Other Osteoanabolic Molecules in a Single Patient with High Bone Density Associated with Metastatic Oligodendroglioma . Funded by SGP - Small Grants Program <\$10K	04/2013 - 04/2015
Co-Investigator	Assessment of Bone Microstructure by High Resolution Peripheral Quantitative CT (HRpQCT) Scanning in Adults with Low-Trauma Fractures Who Have Normal or Near-Normal Bone Density. Funded by SGP - Small Grants Program <\$10K	07/2014 - 07/2016

## Bibliography

### Peer-reviewed Articles

1. **Drake MT**, Baldassare JJ, McConkey CL, Gonzalez EA, Martin KJ. Parathyroid hormone increases the expression of receptors for epidermal growth factor in UMR 106-01 cells. *Endocrinology*. 1994 Apr; 134(4):1733-7. PMID: 8137737
2. Iida-Klein A, Guo J, **Drake MT**, Kronenberg HM, Abou-Samra AB, Bringhurst FR, Segre GV. Structural requirements of parathyroid hormone/parathyroid hormone-related peptide receptors for phospholipase C activation and regulation of phosphate uptake. *Miner Electrolyte Metab*. 1995; 21(1-3):177-9. PMID: 7565444
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