Dear interested participant,

The American Board of Internal Medicine (ABIM) Research Pathway at The Ohio State University combines training in clinical internal medicine with training in basic science or clinical research. The pathway is six or seven years in duration and incorporates:

- Two years of clinical experience as an internal medicine resident
- One or more years of clinical specialty experience as a fellow
- Three years of research training

The total number of years of training is equal to a conventional residency plus fellowship training pathway. The advantages of this pathway are early acceptance into fellowship training, better integration of your clinical residency/fellowship training with your research training and earlier entrance into research training.

If you think you might be interested in the Research Pathway, it is helpful to mention this when scheduling your interview so that more of your questions can be answered.

Individuals with an advanced degree, such as a PhD, or those with extensive research experience and clearly defined research career goals are candidates for this program. Provided the applicant has an identified area of interest (sub specialty training program), we can provide access to both clinical and research faculty during the interview process.

All the best,
Michael Grever, MD
Chair, Department of Internal Medicine
The Ohio State University Wexner Medical Center
Overview of Research Opportunities

The Department of Internal Medicine at The Ohio State University Wexner Medical Center is involved in all aspects of biomedical research, including basic mechanisms of disease, translational studies and clinical trials. Because of our volume and diversity of patients we have had significant impact in the areas of translational and clinical research. The work of Ohio State’s Comprehensive Cancer Center’s Experimental Therapeutics Program is one example of how our bench-to-bedside philosophy brings new cancer therapeutics to the bedside. Department researchers are also actively involved in both defining new underlying pathways and potential therapeutic agents for inflammatory diseases such as systemic lupus erythematosus. We have strong collaborative ties to other Departments and Colleges across the campus which allow us to offer a large range of research opportunities for our trainees, such as the collaboration between Ohio State’s Diabetes Center and Comprehensive Transplant Center which made islet transplantation for diabetes a reality.

Our research is supported by state-of-the-art research facilities such as Ohio State’s Biomedical Research Tower and Dorothy M. Davis Heart and Lung Research Institute. All of the Department’s work is helped by the NIH-funded Center for Clinical and Translational Science, which provides a number of resources for investigators including biostatistical support and study design consultation.

Although we have mentioned only a few aspects of research in the Department of Internal Medicine at Ohio State, we hope it is clear that we have a strong commitment to biomedical research with a vibrant faculty who are dedicated to educating the next generation of physician scientists.

Division of Cardiovascular Medicine

More than half of cardiovascular medicine faculty members are principal investigators for a variety of current research projects in both laboratory and clinical research settings. Basic science research covers a wide spectrum, including mechanisms and treatment of ischemia-reperfusion injury, stem-cell therapy for myocardial infarction, mechanisms of vascular and mitochondrial dysfunction, and innovative imaging methods for studying cardiovascular diseases. Clinical trials on new cardiovascular drug-and-device therapies are conducted in partnership with researchers, healthcare professionals and patients to improve patient care and outcomes. Trials are managed through the Heart and Vascular Research Organization (HVR0), which brings together clinical and basic researchers in more than 100 clinical research projects, including investigator-initiated single-site studies, NIH-sponsored multisite trials, and industry-sponsored trials. Studies focus on heart failure, interventional cardiology, sleep disorders, electrophysiology, non-invasive imaging, exercise/prevention, vascular biology, cardiac genotyping and pulmonary hypertension.

Division of Dermatology

In addition to a heavy clinical focus, the division of dermatology conducts basic research focusing on the pathogenesis of cutaneous T cell lymphoma (CTCL). The long-term goals are to identify biomarkers to improve the accuracy for diagnosis, to monitor response to therapy and to aid the development of novel treatments.
Division of Endocrinology, Diabetes and Metabolism

The division of endocrinology, diabetes, and metabolism is highly active in both clinical and basic research. Clinical research in the area of diabetes are focused on the metabolic aspects of diabetes, as well as optimizing in partial care for Ohio State is one of the only programs in the country studying islet-cell transplantation as a means to treat type I diabetes mellitus. In addition, the division has ongoing research in the genetics of osteoporosis and a long-standing history of clinical research in benign and malignant thyroid disease. Faculty members with joint appointments at the Ohio State University Comprehensive Cancer Center are actively engaged in clinical trials for thyroid, neuro-endocrine, and adrenal cancer. For basic research projects, the Division houses NIH-funded investigators in the area of thyroid and endocrine neoplasia. Ohio State is currently the recipient of the only NIH-supported Project Grant in the area of thyroid cancer, which brings together researchers from the Division with other researchers on campus interested in this disease. In addition to research carried out directly by faculty members, there are opportunities to interact with clinical and basic faculty from other divisions whose interests overlap the broad scope of endocrinology.

Division of Gastroenterology, Hepatology and Nutrition

The Division has a track record of excellence in both clinical and basic research, presenting their findings at national meetings and publishing their results in high-impact journals. The last decade has been one of growth for the division in the areas of hepatology, GI malignancy and GI motility, as well as the clinical applications of endoscopic ultrasound. Investigation of inflammatory bowel diseases has currently been targeted as an area for programmatic expansion. Active research projects include a study to examine autopsy liver pathology from patients dying of acetaminophen overdoses to determine the site of the injury to the liver, which is being investigated by William Lee, MD and Bill Robinson, MD, GI fellow. Additionally, Dr. Lee is pursuing a research project in conjunction with Laura James, MD, and others from the University of Arkansas Medical School, documenting a large database of patients where the level of acetaminophen adducts has been measured. They questioned whether the level of this toxic by product of acetaminophen metabolism can help determine outcome after severe liver injury due to the drug. GI fellow Peter Stanich, MD, is investigating the Gastrointestinal Manifestations of the PTEN Hamartoma Tumor Syndrome along with Marty Meyer, MD, associate program director of the GI Fellowship Program. Anthony Michaels, MD, is leading a multicenter, double-blind, randomized, controlled study to determine the safety and pharmokinetics of ifetroban injection in hepatorenal syndrome.
The Division of General Internal Medicine

The highly collaborative research projects within the Division of General Internal Medicine continue to grow in number:

- In the fall of 2010, we began participating in a genetics project with the Coriell Institute to evaluate newly diagnosed patients with hypertension
- “Teaching to the Core” grant completed (C. Curren, MD & L. Gaabel, PhD); Medical Home Model for patient care: pairing a medical assistant to work with a physician on a regular basis.
- Efficacy of Quinapril plus Alpha Lipoic acid on patients with Insulin Resistance syndrome - A Randomized Crossover Study: Crisafi-Monti grant was awarded and research is in progress by Gowrishankar Gnanasekaran, MD.
- Developing a plan to work collaboratively with the Division of Hospital Medicine and the Department of Surgery to develop a systemwide approach to perioperative care, including standardization of preoperative consultation exams.
- Health Resources and Services Administration (HRSA) – Patient Safety and Clinical Pharmacy Services Collaborative (PSPC) Learning Sessions geared toward improving patient care by collaborating on the improvement and integration of healthcare delivery systems and maximizing use of our clinical pharmacy services and safe medication practices.
- Remote Home Blood Pressure Monitoring: A Feasibility Study – Neeraj Tayal, MD.
- Putting the ABIM Charter into Practice for Central Ohio Physicians, expand upon our previous work using innovations in education and leadership to advance professionalism – Cynthia Ledford, MD.
- A protein- and energy-dense nutritional supplement containing Eicosapentaenoic Acid improved lean body mass in patients with head and neck cancer – Harrison Weed, MD.
- Meditation regulating mitochondrial thiol-redox and function in oxidative stress in humans – A holistic therapeutic approach for neurobehavioral disorders; OIA Gateway Seed Grant – Gowrishankar Gnanasekaran, MD.

Division of Hematology

The Division’s research focuses on discovering biologic mechanisms underlying the development of hematologic malignancies, searching for genetic and epigenetic aberrations that modify response to treatment, and developing novel drug therapies for targeting specific molecular alterations in patients with hematologic malignancies. A common goal in the Division is to move rapidly toward personalized therapy programs tailored to individual patients based on the genetic and epigenetic “make-up” of their diseases and to develop novel therapeutics in early clinical trials for these diseases. In order to pursue this goal, basic researchers and clinicians in the Division work side-by-side to ensure that each novel discovery made in the laboratories is utilized for designing new and well tolerated therapeutic strategies.

The Division is highly recognized for its scientific achievements. Specifically, the Division supports a National Cancer Institute (NCI)-sponsored Leukemia Specialized Programs of Research Excellence (SPORE) grants. In addition clinical, translational, and bench researchers within the Division hold numerous grants including NCI-funded R01, R21s, and K career development awards; national society awards including American Society of Hematology (ASH), American Society of Clinical Oncology (ASCO), and Alliance (formerly the Cancer and Leukemia Group B) junior faculty awards; and foundation awards including a Specialized Center of Research (SCOR) Grant from the Leukemia and Lymphoma Society, Lymphoma Research Foundation, and Pelotonia grants. In addition, the Division supports a K12 training program that provides support for junior
faculty to obtain necessary training and protected time to develop research programs that may ultimately be supported by K23 and K08 awards. Faculty are well published in *Blood*, *Journal of Clinical Oncology*, *New England Journal of Medicine*, *Proceedings of the National Academy of Sciences*, etc.

The Division also participates in clinical trials and correlative science studies conducted by the Alliance, a multidisciplinary national cooperative clinical cancer study group funded by the NCI; the James Survivorship Center; and has a nationally recognized TTP, hemophilia, and sickle cell research program. Members of the Division are currently chair or members of several Alliance, ASH, ASCO, and AACR committees and lead NCI-Cancer Therapy Evaluation Program (CTEP), Alliance, pharmaceutical, and investigator-initiated clinical trials in benign hematologic, stem cell and marrow transplant, myeloproliferative disorders, MDS, leukemia, and lymphoma. Hematologic/Oncologic fellows and internal medicine residents have opportunities to participate in this dynamic research program at multiple levels including:

- Didactic coursework offered through the School of Public Health in Masters in Public Health or Masters in Clinical Investigation degree programs
- Specific training in clinical trials development, design, and implementation through an Experimental Therapeutics program
- Involvement in national societies including ASH and ASCO
- Numerous opportunities to publish and present their work at national meetings.
- Participation in an NCI-funded T32 laboratory training grant that affords fellows two years of protected time for dedicated laboratory research in hematologic malignancies and benign hematologic disorders
- Other relevant T32’s include:
  - cancer genetics T32
  - translational training in experimental therapeutics
  - tumor/mmular T32
  - translational training in Hematology Oncology T32

Fellows within the Hematology/Oncology program at Ohio State are extremely accomplished and have been first authors on numerous papers, presented oral abstracts at American Society of Bone Marrow Transplant (ASBMT), ASH, ASCO, and AACR meetings and have been the recipients of ASH career development awards, ASCO Young Investigator awards, and Pelotonia grants.

**Hospital Medicine**

The Division of Hospital Medicine led a quality initiative regarding DVT (deep vein thrombosis) prevention and has members on the Medical Center’s Quality Improvement Board, as well as the Pharmacy and Therapeutic Committees. The Division was responsible for the publication of “Just the Facts: Hospital Medicine” as well as multiple publications in national journals.

**The Division of Human Genetics**

The division coordinates clinical-genomic databases, specimen repositories and the use of both in-house and referral diagnostic facilities to support clinical research in human genetics, giving patients and physicians in the community-at-large free access to Human Genetics research protocols. Our staff enrolls about 1,600 individuals in non-therapeutic research each year; mainly to the approximately 20 studies initiated by Ohio State investigators. In addition, we collect samples (blood, mouthwash tumors, etc.) from nearly 2,200 individuals each year for research purposes.

A new collaboration was established with Ohio State’s Center for Personalized Health Care and the Coriell Institute for Medical Research in Camden, N.J., which expands the Division’s existing emphasis on using genetics and genomics in the personalization of health care. Family history collection is the most established tool for personalized health care. The Division developed Family HealthLink, a user-friendly online tool that estimates familial risk for both cancer and coronary heart disease. It is a free service that is designed to help individuals learn more about their risk and the steps that can be taken to focus on prevention efforts and can be found at https://familyhealthlink.osumc.edu.

The Division continues to provide numerous local, regional, and national educational talks. Members of the Division also provide leadership in national organizations such as the National Society of Genetic Counselors, the American Board of Genetic Counseling and the National Board of Medical Examiners.
Division of Infectious Diseases

Research activities in the Division of Infectious Diseases include every aspect of the field. Currently, we operate one of the country’s largest AIDS Clinical Trial Units (ACTU) and engage in a broad array of multicenter clinical trials regarding the treatment and management of HIV. Along with The Center for Microbial Interface Biology and the newly founded Department of Microbial Infection and Immunity in the College of Medicine, faculty and fellows participate in basic science and translational research involving intracellular bacterial and fungal pathogens such as tuberculosis and histoplasmosis, as well as parasitology and antiparasitic pharmacology. HIV mother-to-child transmission and gastrointestinal bacterial pathogenesis. Clinical research is also a big part of the Division, with ongoing funded investigations in multicenter epidemiology of drug-resistant pathogens in the healthcare setting such as MRSA, C. difficile and multi-drug-resistant Gram-negative bacteria. Other clinical research involves women’s sexual health epidemiology, international health, antimicrobial usage, osteomyelitis, tuberculosis and transplant patients. Faculty members also engage in research of medical education and evidence-based medicine practices.

Division of Medical Oncology

The Division of Medical Oncology’s research focus is translational research and novel drug development through NCI-sponsored early phase I/II clinical trials programs (U01 and N01 grants). Ohio State is one of only a very few institutions with both U01 and N01 grants supporting both phase I and II research. The faculty is also on the forefront of investigation on the anticancer properties of phytochemicals derived from food products for both cancer prevention and therapy, and on the study of pathogenesis, prevention and therapeutics of virus associated cancers. The Division is highly recognized for its scientific achievements. Specifically, the Division supports a NCI-sponsored PO1 grant focused on thyroid cancer, the James Survivorship Center, in an NCI-funded U01 grant, and a NCI-sponsored N01 contract for early therapeutics trials of novel agents. In addition clinical, translational, and bench researchers within the division hold numerous grants including NCI-funded R01, R21s, and K career development awards; national society awards including American Association of Cancer Research (AACR), ASCO, and Alliance junior faculty awards; and foundation awards including American Cancer Center, Department of Defense, and Pelotonia grants.

In addition, the Division supports a K12 training program that provides support for junior faculty to obtain necessary training and protected time to develop research programs that may ultimately be supported by K23 and K08 awards. Faculty are well-published in, Journal of Clinical Oncology, New England Journal of Medicine, and Proceedings of the National Academy of Science, etc.

The Division also participates in clinical trials and correlative science studies conducted by the Alliance, and has nationally recognized breast oncology program. Members of the Division are currently chair or members of several Alliance, AACR, and ASCO committees and lead NCI-Cancer Therapy Evaluation Program (CTEP), Alliance, pharmaceutical, and investigator-initiated clinical trials in solid tumors. Hematology/Oncology fellows and internal medicine residents have opportunities to participate in this dynamic research program at multiple levels including:
- Didactic coursework offered through the School of Public Health in Masters in Public Health or Masters in Clinical Investigation degree programs
- Participation in an NCI-funded T32 laboratory training grant that affords fellows two years of protected time for dedicated laboratory research in solid tumor malignancies and cancer prevention
- Specific training in clinical trials development, design, and implementation through an Experimental Therapeutics program
- Involvement in national societies including AACR and ASCO; and numerous opportunities to publish and present their work at national meetings

Fellows within the Hematology/Oncology programs at Ohio State are extremely accomplished and have been first authors on numerous papers, presented oral abstracts at ASCO and AACR meetings, and have been the recipients of Clinical and Translational Science (CTSA), ASCO Young Investigator awards, and Pelotonia grants.
Division of Nephrology

We are engaged in basic science, translational and clinical research designed to define mechanisms of kidney disease and identify and test new therapeutics for treating kidney diseases. The Division is recognized internationally for its work in the areas of systemic lupus erythematosus (SLE), urine biomarker discovery, anemia of chronic kidney disease and calcium-phosphate homeostasis in chronic kidney disease. Research is supported by grants from the NIH, private foundations and the pharmaceutical industry. Division researchers were recently awarded three grants from the National Institutes of Health: the SPrinT grant will study the effect of blood pressure control on hypertensive chronic kidney disease patients; the GO grant was awarded to identify genetic risk factors for the progression of lupus nephritis to end-stage renal disease or irreversible renal failure; and the CKD Biomarker Consortium to identify predictors of CKD early in a patient’s course, so therapies to prevent CKD/ESRD can be developed.

Division of Pulmonary, Allergy, Critical Care and Sleep Medicine

We continue to have an active and vibrant research portfolio of basic science, translational and clinical research. Last year, Division investigators conducted more than 70 clinical trials and numerous collaborative research projects, both on campus and with institutions around the world. Among the Division’s efforts are clinical trials being conducted in acute lung injury, critical care delirium, asthma, emphysema, HIV-associated lung disease, sarcoidosis, sleep apnea and cardiac disease, and pulmonary therapeutics. Basic research efforts include exploration in cell signaling in sepsis models, cell survival and apoptosis, respiratory muscle physiology, pathogenesis of Multiple Organ Dysfunction Syndrome and the regulation of inflammation in the lung. Among recent projects were:

- evaluation of GERD in asthma treatment in adults and kids
- screening for asthma in collegiate athletes
- ongoing participation in the Long-Term Oxygen Treatment Trial (LOTT)
- evaluation of weakness in critically ill patients
- treatment of pregnant asthmatics in emergency rooms
- a study evaluating the correlation between nutritional zinc status and sepsis
- discovery of the role of microRNA in pulmonary fibrosis
- evaluation of the role of microRNA in host interactions with pulmonary pathogens
- national multicenter study validating a lung cancer risk test among high risk smokers
- effect of smoking cessation on lung innate immune function in HIV infected individuals

Fellowship support to work with funded investigators studying molecular mechanisms involved in inflammatory lung conditions is available from an NIH T32 training program housed within the Division of Pulmonary, Allergy, Critical Care and Sleep Medicine. The program sponsors two MD and two PhD postdoctoral scientists to work with NIH funded mentors for two years. Areas of focus include lung host defense, apoptosis injury and repair, molecular genetics/pharmacogenomics, cytokines and cell signaling, and translation to lung disease.

Division of Rheumatology and Immunology

The Division’s research effort is focused primarily on systemic autoimmune diseases and neuropathic disorders manifesting as chronic pain conditions. Many of our projects involve collaborations with faculty across campus that bring researchers together to enhance our understanding of rheumatic diseases and to improve the care of patients with these diseases. Areas of special interest include gender bias in autoimmune diseases, biomarkers in lupus, cardiovascular diseases in lupus, development of biomarkers in fibromyalgia, analysis of exercise interventions in fibromyalgia, transition of care for patients with rheumatic diseases from adolescence to adulthood and osteoporosis. Researchers in the Division are also involved in clinical trials that are examining the next generation of therapeutics for many rheumatic diseases including osteoporosis, gout, inflammatory arthritis, systemic lupus erythematosus and osteoarthritis.