

The Case Medical Student Summer Research Program (MSSRP)

Supported by NIH/NIDDK 1T35DK111373-03

May – August

Overview of the Case Medical Student Summer Research Program

The Case MSSRP provides a short-term experience for medical students to perform clinical or basic science research within topics related to the NIDDK mission, including digestive diseases, diabetes, metabolism and nutrition, nephrology, immunology and infectious diseases, GI oncology, and imaging technologies. The overall objective of the program is to encourage medical students to pursue careers as physician scientists.

This 8-week T35 short-term summer research experience provides the trainee with significant exposure to methodologies of basic or clinical research and the process used to investigate important questions in biomedical research. Mentors participating in this program are affiliated with 14 different departments within UHCMC/CWRU SOM and CCLCM-CWRU, providing training opportunities in a broad range of areas of biomedical research. Medical students participating in the Case MSSRP under the guidance of a mentor associated with this T35 training program will benefit from a multi-disciplinary research network, rather than simply working within an individual laboratory.

Another major strength of the program is the emphasis on exposure to new research methodologies and live demonstrations to complement didactic and research training. Our three-day hands-on research short-course is highly innovative and will provide medical students with unique exposure and direct experience to cutting-edge basic and clinical research methods relevant to the NIDDK mission.

Exposure & Expectations

During this T35 program, medical students will be exposed to:

- 8-week summer research experience (paid)
- 15 hours classroom instruction on the Responsible Conduct of Research
- Institutional training in vertebrate animals, IRB, and radioisotopes
- 3-day short-course on NIDDK-focused research methods & advanced techniques
- Weekly summer journal club

After completion of this T35 program, medical students shall be able to:

- Write a research proposal
- Orally present research proposal
- Demonstrate knowledge of technical laboratory skills
- Submit abstract of research findings
- Prepare a poster and/or oral presentation for Irwin H. LePow Medical Student Research Day
- Present poster at Department of Medicine Research Day

Duration & Timing

The Case MSSRP is focused on a short-term summer **research experience comprised of 8 weeks of full-time effort (40 hrs per week)** where trainees perform original research under the guidance of a T35 faculty mentor. *Please note that the dates below are tentative and subject to change at the discretion of the Co-PIs, and include longer-term opportunities to present research.*

Date	Activity
January 11, 2019	Applications due for early decision
February 8, 2019	Decision made and communicated for early applicants
February 15, 2019	Application due date
March 8, 2019	Decision made and communicated for regular applicants
May 2019	Oral research proposal presentation, IBMS 500 course on Responsible Conduct of Research
Late May/Early June	Program Orientation
February – May 2019	Required Research Training (Responsible Conduct of Research, IRB, Vertebrate Animals, Radioisotopes, etc.)
June 2017 – August 2019	Participation in 8 weeks of NIDDK-related research, Attend Weekly Journal Clubs
August 2019	T35 End-of-Program Lunch Reception for mentors and mentees
September 2019	Oral and/or poster presentation at H. LePow Medical Student Research Day
April-May 2020	Presentation at Department of Medicine Research Day
September 2020	Option to attend Cleveland IDEAS Symposium, the bi-annual Cleveland DDRCC Research Symposium
2019/2020	Required four month research block can be used to further develop Case MSSRP Research Project, Elective research year (MSTP fellowship) available.

After completion of the 8-week short-term summer research program, selected students will be encouraged by the Program Directors and their mentors to apply for extramural short-term medical student research fellowships (offered by the American Gastroenterological Association and the Crohn's & Colitis Foundation of America, etc.). As part of the CWRU SOM curriculum, all medical students perform research during a 4-month block in their 3rd or 4th year and write a thesis. Students will be encouraged to use this opportunity to continue to expand the T35-supported research that they performed throughout the Case MSSRP summer research experience between their 1st and 2nd year. In addition, students will be well-positioned for the opportunity to also apply for an MSTP fellowship, which would support successful candidates to take a year off from medical school and perform 12 months of dedicated research in their mentor's laboratory.

Mentors

The Case MSSRP primary faculty includes 26 productive and highly collaborative investigators from within the CWRU SOM and CCLCM-CWRU that all have active NIDDK-funded research programs in the areas of (1) digestive & liver diseases, (2) diabetes, (3) nutrition & metabolism, (4) kidney diseases, or (5) digestive, liver, & kidney imaging. The Case MSSRP faculty also includes an additional 13 secondary mentors, each of whom have highly active research programs that align with the NIDDK mission, but are currently funded through other NIH Institutes (i.e. NCI, NIAID, NIAAA, etc.). These investigators will provide their guidance, expertise, and career mentoring during the short-term summer research experience. Our primary and secondary faculty also include select junior faculty mentors who are new to mentoring trainees. Please see attachments for additional information on our mentors.

Applications

If you are interested in pursuing this exciting opportunity, please review the provided information and contact your desired mentor to schedule an appointment to meet with them. Once an agreed-upon research project has been determined, please complete the Case MSSRP Application Google form (link: <https://goo.gl/forms/Z8qWfBZNK2BgFPYy1>). *Please note: a summer stipend of \$4,054.00 will be provided to all T35 trainees.*

The Training Program Checklist

The success of the T35 Case MSSRP strongly hinges on effective communication of expectations between the trainee and the mentor. The Training Program Checklist will be utilized by the trainee and mentor as a guide through a meaningful summer research experience. A copy of this checklist has been provided for your review.

ATTACHMENT 1 – TRAINING PROGRAM CHECKLIST

The Case Medical Student Summer Research Program (MSSRP)

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Training Program Checklist

Case MSSRP Faculty Mentors:

- Identify and set defined expectations for the summer research experience.
- Assist students with any required IRB or IACUC applications.
- Assist students in identifying their SPECIFIC ROLE(S) in the project.
- Review the student's research proposal (~1000 words).
- Provide space and resources necessary for the project.
- Assist with statistical analysis (if necessary).
- Include student trainee in all team activities (group meetings, journal clubs, etc.)
- Meet with student weekly during the 8-week summer research period to review progress and provide direction.
- Complete final student evaluation within one week of the end of the summer research experience.
- Provide advice to trainees on career paths for becoming a clinician investigator.

Case MSSRP Student Trainees

Application Process

- Identify a Case MSSRP faculty mentor and feasible 8-week summer research project.
- Identify and set defined expectations with the mentor for the summer research experience.
- Complete any required IRB or IACUC applications for research involving humans or vertebrate animals.
- Work with mentor to clearly identify your SPECIFIC ROLE(S) in the project.
- Submit a student's research proposal (~1000 words) and program application by February 10.

8-Week Summer Research Period

- Complete a 5-min oral presentation on your proposed research to the faculty for feedback and critique.
- Complete IBMS 500 course "On Being a Professional Scientist" (15hrs, Responsible Conduct of Research).
- Complete any required training for research involving humans, vertebrate animals, lab safety or radioisotopes.
- Spend at least 40 hrs per week engaged in active research.
- Participate in all team activities associated with your mentor's research (group meetings, journal clubs, etc.).
- Participate in the Case MSSRP 3-day short-course on NIDDK-related research methodologies.
- Participate in Journal Club.
- Meet with faculty mentor and Program Director weekly to review progress and receive direction.

Post-Summer Research Period

- Complete a mentor evaluation form within one week of the end of the summer research experience.
- Submit abstract for the LePow Student Research Day.
- Present a poster, and possibly an oral presentation, on your completed research at LePow Research Day.
- Investigate the option of extending your summer research project for the 4-month Research Block during Year 3.
- Consult with your mentor regarding possible submission of a manuscript to a peer-reviewed journal

To apply, please fill out the Google form at the following link:

<https://goo.gl/forms/Z8qWfBZNK2BgFPYy1>

Please email Rachael Murphy at rxm606@case.edu with any questions about this program.

ATTACHMENT 2 - MSSRP MENTOR INFORMATION
The Case Medical Student Summer Research Program (MSSRP)
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NIDDK-Funded Primary Mentors				
GROUP 1: Digestive & Liver Diseases	GROUP 2: Diabetes	GROUP 3: Metabolism & Nutrition	GROUP 4: Kidney Diseases	GROUP 5: Digestive, Liver, & Kidney Imaging
Derek Abbott, MD, PhD	David Buchner, PhD*	Henri Brunengraber, MD, PhD	Leslie Bruggeman, PhD	Christopher Flask, PhD
Fabio Cominelli, MD, PhD	Rose Gubitosi-Klug, MD, PhD	Donna Driscoll, PhD	Stanley Hazen, MD, PhD	Vikas Gulani, MD, PhD
Gregory Cooper, MD, MPH	Richard Zigmond, PhD	Darcy Freedman, PhD, MPH*	John O'Toole, MD	Katherine MacRae Dell, MD
Mitchell Drumm, PhD		John Kirwan, PhD	Mahboob Rahman, MD	
Claudio Fiocchi, MD		Maria Hatzoglou, PhD	John Sedor, MD	
Wendy Goodman, PhD*		Vincent Monnier, MD		
Lina Lu, MD				
Theresa Pizarro, PhD				
Takuya Sakaguchi, PhD*				
NIDDK-Related Secondary Mentors				
GROUP 6: GI Cancers & Tumorigenesis	GROUP 7: Metabolism & Kidney Disease	GROUP 8: Inflammation & Infection	GROUP 9: Imaging & Other Diagnostic Technology	
Amitabh Chak, MD	Timothy Kern, PhD	Donald Anthony, Jr, MD, PhD	Anant Madabushi, PhD	
Sanford Markowitz, MD, PhD	Laura Nagy, PhD	Robert Bonomo, MD	Jon C. Davidson, MD, FSIR	
	Thomas Hostetter, MD	Maneesh Dave, MD*		
		Curtis Donskey, MD		
		Alex Rodriguez-Palacios, PhD, DVM*		
		Carlos Subauste, MD		

Research Interests for Case MSSRP T35 Mentors (NIDDK Grant Number Indicated)

DEREK ABBOTT, MD, PhD, Professor of Pathology, CWRU; Member, Cleveland DDRCC; Mentor: Digestive Diseases T32 (NIDDK), Cell & Molecular Biology T32, Immunology T32, MSTP T32. Dr. Abbott's research focuses on mechanisms of activation of NOD2 in Crohn's disease and mechanisms of cytokine release by NOD2 (P01 DK091222, Project 2 PI)

DONALD ANTHONY, Jr, MD, PhD, Associate Professor of Medicine (Infectious Diseases & HIV) & Pathology, CWRU; Member, Cleveland DDRCC; Mentor: Immunology T32, Molecular Medicine T32, Geographic Med. & Infectious Diseases T32. Dr. Anthony's research focuses on immune cell function during hepatitis C virus infection.

ROBERT BONOMO, MD, Professor of Medicine, Pharmacology, Molecular Biology & Microbiology, CWRU; Mentor: MSTP T32, Molecular Therapeutics T32, Geographic Med. & Infectious Diseases T32. The primary focus of our laboratory is to understand the genetic and amino acid sequence determinants of the enzymes that inactivate β -lactams, the β -lactamases.

LESLIE BRUGGEMAN, PhD, Associate Professor of Molecular Medicine (Nephrology & Hypertension), CWRU; Mentor: Nephrology T32 (NIDDK). Dr. Bruggeman's research focuses on molecular and cellular biology of chronic kidney diseases (R01 DK095832, R01 DK108329, R01 DK097836).

HENRI BRUNENGRABER, MD, PhD, Mount Sinai Auxiliary Commemorative Professor of Nutrition Research; Chairman, Dept. of Nutrition, CWRU; Director, Case Mouse Metabolic Phenotyping Center; Member & Scientific Prog. Leader, Cleveland DDRCC; Mentor: Urology T32 (NIDDK), MSTP T32. Dr. Brunengraber's research focuses on metabolic regulation, design and testing of artificial nutrients, noninvasive probes of liver metabolism; markers of alcoholism, mass spectrometry; metabolomics. (U24 DK076174). He was also the longstanding director of the previous T32 Metabolism Training Grant.

DAVID BUCHNER, PhD, Assistant Professor of Genetics & Biochemistry, CWRU. Dr. Buchner's laboratory is focused on understanding the genetics and pathophysiology of obesity and diabetes (R03 DK099533). Dr. Buchner is a junior mentor for this T35 application and will function in this capacity under the guidance of a senior faculty mentor.

AMITABH CHAK, MD, Professor of Medicine (GI & Liver Diseases) & Oncology, CWRU; Pilot/ Feasibility Program Director & Member, Cleveland DDRCC; Mentor: Digestive Diseases T32 (NIDDK). Dr. Chak's patient-oriented research focuses on novel endoscopic imaging techniques, Barrett's esophagus, and esophageal adenocarcinoma.

FABIO COMINELLI, MD, PhD, Hermann Menges, Jr. Professor of Medicine (GI & Liver Diseases) & Pathology, CWRU; Chief, Division of GI & Liver Diseases, UHCMC; Director, CWRU/UHCMC Digestive Health Institute; Director & Member, Cleveland Digestive Diseases Research Core Center (DDRCC); Mentor: Digestive Diseases T32 (Co-Director, NIDDK), Immunology T32. Dr. Cominelli's research focuses on the role of the cytokine network and the gut microbiota in the regulation of mucosal immune responses and their alteration in human and experimental IBD (R01 DK055812; R01 DK042191; P01 DK091222, PD & Project 2 PI). He also directs the Cleveland Digestive Diseases Research Core Center (P30 DK097948, PD) and co-directs the post-doctoral Combined Training Program in Digestive Disease Sciences (T32 DK083251, co-PD).

GREGORY COOPER, MD, Professor of Medicine (GI & Liver Diseases) & Epidemiology, CWRU; Gastroenterology Fellowship Training Program Director, CWRU/UHCMC; Clinical Component Director & Member, Cleveland DDRCC; Mentor: Digestive Disease T32 (NIDDK). Dr. Cooper's research focuses on the epidemiology of colon cancer and advanced detection methods (P30 DK097948).

MANEESH DAVE, MD, MPH, Assistant Professor of Medicine (GI & Liver Diseases), CWRU. Dr. Dave's research focuses on the role and mechanisms of action of mesenchymal stem cells in mouse models of CD-like ileitis and patients with IBD. Dr. Dave is a junior faculty mentor for this T35 application and will function in this capacity under the guidance of a senior faculty member.

JON C. DAVIDSON, MD, FSIR, Assistant Professor of Angio/Interventional Radiology, CWRU; Fellowship Director, Department of Interventional Radiology, UHCMC. Dr. Davidson's research focuses on anti-coagulation medication guidelines and use in Interventional Radiology; currently working on a research project to percutaneously inject blood products into patients with coagulation disorders.

CURTIS DONSKEY, MD, Professor of Medicine (Infectious Diseases & HIV), CWRU; Mentor: Digestive Disease T32 (NIDDK), Geographic Med. & Infectious Diseases T32. Dr. Donskey's basic and clinical research focuses on the mechanisms by which the normal intestinal microflora inhibit colonization by nosocomial pathogens.

DONNA DRISCOLL, PhD, Staff, Department of Cell Biology & Vice-Chair for Faculty Development, CCF; Professor of Molecular Medicine, CCLCM-CWRU; Member, Cleveland DDRCC; Mentor: Molecular Medicine T32. Dr. Driscoll's research focuses on translational re-coding of the UGA codon as selenocysteine, the 21st amino acid, and regulation of selenoprotein synthesis (R01 DK078591).

MITCHELL DRUMM, PhD, Professor of Pediatrics (Pulmonology) & Genetics, CWRU; Director, Fibrosis Research Center; Member, Cleveland DDRCC; Mentor: Cardiovascular Genetics T32, Pediatric Respiratory Research T32, Neonatal Research

T32. Dr. Drumm's research focuses on the genetics and molecular biology of cystic fibrosis, with a focus on the gastrointestinal manifestations of the disease (P30 DK027651).

CLAUDIO FIOCCHI, MD, Clifford and Jane Anthony Chair for Digestive Disease Research & Education, Departments of Pathobiology & GI & Hepatology, CCF; Professor of Molecular Medicine, CCLCM-CWRU; BioRepository Core Director & Member, Cleveland DDRCC; Mentor, Digestive Diseases T32 (Director, NIDDK), Molecular Medicine T32. Dr. Fiocchi's research program is focused on the pathogenesis of IBD and the immune, non-immune, and cell-cell interaction events occurring in the intestinal mucosa of IBD patients. (T32 DK083251; R01 DK050984, R01 DK069854, R01 DK093630, P30 DK097948, BioRepository Core)

CHRISTOPHER FLASK, PhD, Associate Professor of Radiology, Biomedical Engineering, and Pediatrics, CWRU; Assoc. Director, Histology/ Imaging Core & Member, Cleveland DDRCC; Director, Case Imaging Research Center; Mentor: Urology T32 (NIDDK), Nephrology T32 (NIDDK), Interdisciplinary Biomedical Imaging T32, Musculoskeletal T32

Dr. Flask's research focuses on MRI imaging biomarkers of ARPKD kidney and liver disease in children. (R01 DK085099)

DARCY FREEDMAN, PhD, MPH, Associate Professor of Epidemiology & Biostatistics, CWRU. Dr. Freedman's research focuses on the effects of fo

od hub openings as a nutritional intervention in urban communities on rates of obesity (R01 DK108184). Dr. Freedman is a junior faculty mentor for this T35 application and will function in this capacity under the guidance of a senior faculty mentor.

WENDY GOODMAN, PhD, Instructor of Pathology, CWRU. Dr. Goodman's research focuses on regulatory T cell function in Crohn's disease and experimental IBD. Dr. Goodman is a junior faculty member for this T35 application. She is highly enthusiastic about mentoring T35 summer research trainees and will function in this capacity under the guidance a senior faculty mentor.

ROSE GUBITOSI-KLUG, MD, PhD, Mary Blossom Chair in Pediatric Diabetes, Associate Professor of Pediatrics (Endocrinology) & Pharmacology; Interim Chief, Division of Pediatric Endocrinology, Diabetes, & Metabolism, CWRU; Mentor: Cardiovascular Genetics T32. Dr. Gubitosi-Klug's basic and clinical research focuses on the role of the leukotriene cascade in early diabetic retinopathy, and epidemiologic studies in patients with long-term type I diabetes (DP3 DK101074; DP3 DK104438; DP3 DK106890; U01 DK094057).

VIKAS GULANI, MD, PhD, Professor of Radiology, Urology and Biomedical Engineering, CWRU; Director, Magnetic Resonance Imaging; Member, Cleveland DDRCC; Mentor: Interdisciplinary Biomedical Imaging T32. Dr. Gulani's translational research focuses on developing new MRI methods that provide a quantitative underlay for evaluation of liver tissue/pathology. (R01 DK098503)

MARIA HATZOGLOU, PhD, Professor of Nutrition, Genetics and Pharmacology, CWRU; Member, Cleveland DDRCC; Mentor: Cell & Molecular Biology T32, MSTP T32. Dr. Hatzoglou's research program focuses on the molecular mechanisms regulating gene expression during stress induced by nutrient limitation. (R37 DK060596; R01 DK053307)

STANLEY HAZEN, MD, PhD, Chair, Department of Cellular & Molecular Medicine, CCF, Professor of Molecular Medicine, CCLCM-CWRU; Mentor: Cardiovascular Genetics T32, MSTP T32. Dr. Hazen's research focuses on understanding the molecular mechanisms by which inflammation contributes to disease. His NIDDK-funded research areas focus on the role of a diet-induced gut microbiota-mediated pathway as a predictor of CKD susceptibility and adverse prognosis (R01 DK106000).

THOMAS HOSTETTER, MD, Professor of Medicine (Nephrology & Hypertension), Vice-Chairman of Research Services, UHCMC/CWRU. Dr. Hostetter's research focuses on identification of novel therapies and biomarkers for chronic kidney disease.

TIMOTHY KERN, PhD, Professor of Medicine and Pharmacology, CWRU; Director, Center for Diabetes Research; Mentor: Urology T32 (NIDDK), Molecular Therapeutics T32, Visual Sciences T32. Dr. Kern's research focuses on how hyperglycemia causes retinopathy in animal models of diabetes.

JOHN KIRWAN, PhD, Staff, Departments of Pathobiology & Gastroenterology & Hepatology, CCF; Professor of Molecular Medicine, CCLCM-CWRU; Co-Director, Case Mouse Metabolic Phenotyping Center; Mentor: Digestive Diseases T32 (NIDDK), Molecular Medicine T32. Dr. Kirwan's research focuses on the effects of insulin resistance on aging, skeletal muscle metabolism, fatty liver disease, and obesity (R01 DK108089, U34 DK107917).

LINA LU, MD, Staff, Department of Immunology, CCF; Professor of Molecular Medicine, CCLCM-CWRU. Dr. Lu's research focuses on mechanisms of liver immunity and regulation during inflammatory disease and transplant (R01 DK103581, R01 DK 084192).

KATHERINE MACRAE DELL, MD, Professor of Pediatrics (Nephrology); Chief, Division of Pediatric Nephrology; Mentor: Nephrology T32 (NIDDK), Interdisciplinary Biomedical Imaging T32. Dr. MacRae Dell's research focuses on MRI imaging biomarkers of ARPKD kidney and liver disease in children. (R01 DK085099)

ANANT MADABUSHI, PhD, Professor of Biomedical Engineering, Radiology, Pathology and Urology, CWRU; Mentor: Cardiovascular Genetics T32, Interdisciplinary Biomedical Imaging T32. Dr. Madabushi's research focuses on quantitative image analysis and multi-modal, multi-scale correlation of massive data sets for disease diagnostics, prognostics, therapy related to cancer.

SANFORD MARKOWITZ, MD, PhD, Professor of Medicine (Hematology & Oncology), Molecular Biology & Microbiology, CWRU; Mentor: Digestive Diseases T32 (NIDDK), Cancer Biology T32, Cell & Molecular Biology T32, Interdisciplinary Biomedical Imaging T32, MSTP T32, Molecular Medicine T32. Dr. Markowitz's research focuses on abnormalities in colon cancer, including studies of colon cancer suppressor genes and oncogenes, functions of positive and negative regulatory growth factors, and the role of genomic instability in inherited and sporadic colon cancers.

VINCENT MONNIER, MD, Professor of Experimental Pathology, CWRU; Mentor: Urology T32 (NIDDK), Dermatology T32, MSTP T32, Visual Sciences T32. Dr. Monnier's research focuses on the molecular mechanisms by which the aging process leads to impairment of protein function. In particular, his research studies the predictive value of metabolic stress markers for long-term increased risk of vascular complications in patients with type-I diabetes (DP3 DK101123).

LAURA E. NAGY, PhD, Staff Scientist, Dept. of Pathobiology, CCF; Professor, Dept. of Nutrition, CWRU; Professor of Molecular Medicine, CCLCM-CWRU; Director, Cleveland Alcohol Research Center; Scientific Prog. Leader & Member, Cleveland DDRCC; Mentor: Immunology T32, MSTP T32. Dr. Nagy's research focuses on the underlying immunological and molecular mechanisms by which chronic alcohol consumption contributes to chronic hepatitis and diabetes.

JOHN O'TOOLE, MD, Associate Professor of Medicine (Nephrology & Hypertension), CWRU; Mentor: Nephrology T32 (NIDDK). Dr. O'Toole's research focuses on the genetics of human kidney disease (R01 DK108329, R01 DK091597, R01 DK097836).

THERESA PIZARRO, PhD, Professor of Pathology and Medicine, CWRU; Associate Director & Member, Cleveland DDRCC; Director, Cleveland DDRCC Enrichment Program & Histology/Imaging Core; Mentor: Digestive Diseases T32 (NIDDK), Immunology T32. Dr. Pizarro's research program focuses on basic cytokine biology, epithelial-dendritic cell interactions gut health and disease, and gender differences in the pathogenesis of IBD (R01 DK042191, P01 DK091222, Project 3 PI, P30 DK097948).

MAHBOOB RAHMAN, MD, Professor of Medicine (Nephrology & Hypertension), CWRU; Mentor: Nephrology T32 (NIDDK), Cardiovascular Genetics T32. Dr. Rahman's clinical research focuses on identifying predictors of rapid progression of chronic renal insufficiency and clarifying the relationship between kidney dysfunction and the risks of subclinical and clinical cardiovascular events and death (U01 DK061021)

ALEXANDER RODRIGUEZ-PALACIOS, PhD, DVM, Assistant Professor of Medicine (GI & Liver Diseases), CWRU; Technical Director, Cleveland DDRCC Mouse Models Core. Dr. Rodriguez-Palacios' research focuses on animal models on intestinal inflammation and methods for assessing the 3-D architecture of inflamed intestinal tissues. Dr. Rodriguez-Palacios is a junior T35 faculty mentor who will function in collaboration with a senior faculty mentor.

TAKUYA SAKAGUCHI, PhD, Assistant Staff, Department of Stem Cell Biology & Regenerative Medicine, CCF; Assistant Professor of Molecular Medicine, CCLCM-CWRU. Dr. Sakaguchi's research focuses on the genetics of the biliary system formation (R01 DK103637). Dr. Sakaguchi is a junior faculty mentor on this T35 application and will function in this capacity under the guidance of an experienced senior faculty mentor.

JOHN SEDOR, MD, Professor of Molecular Medicine (Nephrology & Hypertension), Physiology & Biophysics; Vice-Chairman for Research, Department of Medicine, CWRU; Mentor, Nephrology T32 (Director, NIDDK), Cardiovascular Genetics T32, Interdisciplinary Biomedical Imaging T32. Dr. Sedor's research focus on defining the clinical, cellular and genetic bases of kidney disease, including identification of nephropathy susceptibility genes and defining mechanisms of kidney disease progression using in vitro (cell culture) and animal models. (T32 DK007740, R01 DK097836)

CARLOS SUBAUSTE, MD, PhD, Professor of Medicine (Infectious Diseases & HIV Medicine), Ophthalmology & Pathology, CWRU; Mentor: Nephrology T32 (NIDDK), Immunology T32, MSTP T32, Molecular Medicine T32, Geographic Med. & Infectious Diseases T32, Visual Sciences T32. Dr. Subauste's research focuses on the role of CD40 in immune responses to various pathogens and diabetic inflammation, and uses transgenic diabetic mouse.

RICHARD ZIGMOND, PhD, Professor of Neurosciences, Neurological Surgery and Pathology, CWRU; Mentor: Neurodegenerative Diseases T32, Visual Sciences T32. Dr. Zigmond's research focuses on plasticity in the adult nervous system, particularly on alterations that occur in response to (1) neural damage and (2) changes in the neural activity due to diabetic neuropathy. (R01 DK097223)

Attachment 3 – MSSRP RESEARCH PROJECT PROPOSAL GUIDELINES
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Please Note: The sum of your Project Proposal should be no longer than four pages (excluding references).

Background & Significance

No more than 500 words.

Hypothesis

3 – 4 lines maximum

Specific Aims

1 – 2 Specific Aims maximum

Research Strategy

Describe the overall experimental design, methods to be used, analysis to be performed, and data to be reported.

Potential Pitfalls & Alternative Plans

*Consider potential problems in your approach.
List strategies you will use to address these problems if they arise.*

References

List references cited in your research strategy.