**Summer Projects 2024**

**Faculty contact name and email address:** Mary F. Brunette MD, Mary.f.brunette@dartmouth.edu

**Department name:** Psychiatry

**Project 1 title and description:** **Tobacco use prevalence and interventions**

* + People with serious mental illness and other complex populations are more likely to smoke cigarettes and less likely to quit. Some tobacco products may reduce harm compared to combustible cigarettes. My lab is involved with various studies investigating cigarette smoking and electronic cigarette use as a potential harm reduction strategy. A student could participate in clinical trial work, survey data analysis or secondary data analysis, depending upon their areas of interest

**Project 2 title and description:** **Cannabis use prevalence and interventions in people with serious mental illness**

* + People with serious mental illness and other complex populations are more likely to use cannabis and may experience worsening of their illness due to their substance use. Genetic risk for cannabis use and serious mental illness may overlap, and use of cannabis may provide reinforcement by ameliorating brain abnormalities in mental illness.  Level of use or lower potency products may provide benefit or reduce harm compared to higher levels or intensities. My lab is involved with various studies investigating cannabis use. A student could participate in literature review or secondary data analysis, depending upon their areas of interest.

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**Andrew P. Loehrer, MD, MPH (****andrew.p.loehrer@hitchcock.org****)**

**Department of Surgery
Dartmouth Cancer Center**

**Admin: Julie Bauer (****Julia.a.bauer@hitchcock.org** **)**

**Political and Social Drivers of Cancer Care Inequity**

**Research Overview and Student Participation**

Dr. Loehrer is a surgical oncologist and health services researcher whose work focuses on health equity, specifically evaluating the intersection of public policy, political determinants of health, and exploited and oppressed populations. Medical students will have an opportunity to participate in one or multiple studies including 1) evaluation of the influence of federal and state health policy on the equity of cancer care delivery, 2) assessment of the impact of social spending by hospitals and governments on equity of cancer care and 3) determine the influence of cancer center location as mechanism of structural racism in the United States. Students with various degrees of prior research experience are welcome. For students with minimal prior exposure to research, there are opportunities to participate in study design, conducting literature reviews, participation in interpretation of data, and composition of abstracts and manuscripts. For those students with more experience in research methodology and data analysis, we will work to start developing their own portfolio and/or expand expertise in advanced methodologies. All students will complete research ethics and confidentiality training. Additional educational materials will be utilized to strengthen students’ foundational knowledge of surgical health services and policy research.

Funds are not provided for opportunity. However, students are encouraged to apply for the Dow Surgical Education Research Scholarship through the Department of Surgery as well as other funds available through the Geisel School of Medicine.

We (i.e., the Northern New England **CO-OP** Practice and Community Based Research Network) have chosen to advertise our new project on climate-informed primary care. I’ve Cc’d the listed admin support and our department chairs, Drs. Hudon and Wilson.

* Faculty contact name and email address: Dr. Meagan Stabler | Meagan.e.stabler@hitchcock.org
* Administrative support contact name and email address: Dr. Paula Hudon | Paula.S.Hudon@Hitchcock.org
* Department name: Department of Community and Family Medicine
* Project title and description:

Title: Assessing the State of Climate-Informed Primary Care in Northern New England

Description: Northern New England (NNE) faces distinct climate-related health risks including exposure to poor air quality, elevated heat and humidity, increased occurrence of extreme weather events, increased exposure to waterborne and foodborne illnesses, increased frequency of vector-borne diseases, and rising mental health impacts. Rural residents face unique climate-related health challenges related to geographic isolation and known health inequities, and elderly residents face additional risks due to physical challenges and social isolation. Recent surveys show that healthcare providers are the most trusted source for climate change information among the public, and primary care clinicians (PCCs) around the country have acknowledged climate change’s relevance to their practice. However, many lack confidence discussing climate change with patients, highlighting the fact that climate change curricula is included in only 15% of medical schools. Therefore, there is a critical need to assess climate-related health needs among our rural population, identify educational and resource needs among clinicians, and address gaps in climate-informed primary care for NNE. Our goal is to generate necessary information for developing targeted interventions and toolkits to address the region's unique climate-related healthcare needs.

We will 1. Assess climate-related health needs among NNE’s rural and aging population, 2. Understand PCC perspectives on climate-related health impacts, and 3. Identify best practices in developing and disseminating a region-specific climate-informed healthcare toolkit for NNE

Study findings will significantly impact climate-informed care across NNE. By understanding the needs of both residents and PCCs, we can prioritize community-specific climate impacts, offer region-specific training and resources, and establish best practices to support clinicians and our local communities. This research will serve as a baseline assessment, guiding tailored continuing education within the Northern New England CO-OP Practice and Community Based Research Network (NNE CO-OP PCBRN) on climate-informed care topics. The results will foster strategic climate and health collaborations in our region, and lay the groundwork for future research and interventions to address the unique healthcare challenges faced within our rural communities. At the conclusion of this project, we will be well positioned to compete for extramural funding such as through the Agency for Healthcare Research and Quality’s Climate Change and Healthcare program.

* Indicate whether you are providing funding (yes or no): No

Thank you,

Meagan Stabler, Ph.D., CHES

Executive Director, NNE CO-OP PCBRN

Assistant Professor, Community and Family Medicine

Dartmouth-Hitchcock Medical Center

Geisel School of Medicine at Dartmouth

**Dartmouth Cancer Center**

**Andrew Loehrer, MD, MPH**

Andrew.P.Loehrer@hitchcock.org

**Research Overview and Student Participation**

Dr. Loehrer is a surgical oncologist and health services researcher whose work focuses on health equity, specifically evaluating the intersection of public policy, political determinants of health, and exploited and oppressed populations. Medical students will have an opportunity to participate in one or multiple studies including 1) evaluation of the influence of federal and state health policy on the equity of cancer care delivery, 2) assessment of the impact of social spending by hospitals and governments on equity of cancer care and 3) determine the influence of cancer center location as mechanism of structural racism in the United States. Students with various degrees of prior research experience are welcome. For students with minimal prior exposure to research, there are opportunities to participate in study design, conducting literature reviews, participation in interpretation of data, and composition of abstracts and manuscripts. For those students with more experience in research methodology and data analysis, we will work to start developing their own portfolio and/or expand expertise in advanced methodologies. All students will complete research ethics and confidentiality training. Additional educational materials will be utilized to strengthen students’ foundational knowledge of surgical health services and policy research.

**Section of Ophthalmology, Department of Surgery**

**Nikhil Batra, MD**

Nikhil.M.Batra@hitchcock.org

**Michael Zegans, MD**

Michael.E.Zegans@hitchcock.org

The section of ophthalmology is looking for a motivated M1 medical student who is interested in a career in ophthalmology to join us during the 2024 summer for a hands-on experience in conducting clinical research. This will include mentored outcomes research in secondary intraocular lens Implants (anterior chamber vs. scleral fixated), retinal detachment surgery, and macular surgery. Additional research involves the ophthalmic manifestations of Vitamin A deficiency, as well as an evaluation of our recently initiated ophthalmology residency. The research is expected to result in a quality and outcomes report that will be published and accessible with open access., as well as abstract submission to a regional or national conference, and manuscript submissions to a peer reviewed ophthalmology journals. The opportunity to submit ophthalmology case reports for publication also exists. The student will have the chance to hone their ophthalmology knowledge and skills by fully participating in occasional clinic sessions and OR cases with faculty mentors, as well as formal didactics. The EyeSi cataract surgery simulator could be available for interested students to use under the supervision of our ophthalmology residents.

Thank you for your consideration.

**Section of Urology, Department of Surgery**

**Rachel Moses, MD, MPH**

Rachel.A.Moses@hitchcock.org

Rachel.A.Moses@dartmouth.edu

Projects:

1. Title: Genitourinary Outcomes Following Interventions for Pelvic Malignancy (GOFI MIPO)

Background: Genitourinary radiation injury unpredictably occurs in up to 10%-20% of patients undergoing radiation for pelvic cancer and may lead to repeated admissions and surgery for bleeding complications and genitourinary obstruction. In contrast to alternative pelvic cancer survivorship adverse outcomes, such as stress urinary incontinence or erectile dysfunction following radical prostatectomy that can be managed definitively with evidence based pharmacologic and surgical interventions, there are a lack of definitive, organ sparing radiation injury treatments.

Purpose: To better understand the genitourinary outcomes and adverse urinary events following radiation versus alternative intervention for pelvic malignancy including prostate, and cervical cancer.

* 1. Facilitate data collection for the GOFI MIPO database.
	2. Explore changes in urine biomarkers and patient reported outcomes following hyperbaric oxygen therapy for radiation cystitis.
	3. Evaluate long term outcomes of radiation for pelvic malignancy.
	4. Evaluate variation in treatment for pelvic radiation injury management.
1. Exploring Decision Making and Outcomes in Metoidioplasty and Phalloplasty Gender Affirming Surgery

Background:

Metoidioplasty and phalloplasty gender affirming surgeries (MaPGAS) are increasingly performed and are important for many to achieve gender congruence but remain high risk procedures that require patients to make complex decisions affecting future gender congruence, fertility, urinary, and sexual function. However, there is a lack of validated MaPGAS decision support due to a historical lack of understanding of patients’ decisional needs and dearth of high quality published outcomes or guidelines. Taken together, this limits the extent of MaPGAS counseling and shared decision making, potentially leading to poor quality decisions and unexpected outcomes.

Purpose: To better understand outcomes and improve decision making in MaPGAS.

* 1. Facilitate data collection for MaPGAS via the Dartmouth Health Gender Affirming Surgery Health, Decision Making and Quality of Life longitudinal Registry (GASH DM QOL).
	2. Evaluate changes in clinical and patient reported outcomes pre and post gender affirming surgery.
	3. Application of decision-making support in patient decision readiness and decisional conflict.

**Duncan Morhardt, MD, PhD**

Duncan.R.Morhardt@hitchcock.org

Our lab works with zebrafish to understand the development of the urinary system. Our knowledge of the zebrafish urinary system can be extrapolated to and harnessed as interventions in human disease. As part of these investigations, we are characterizing the physiology of the zebrafish bladder. This involves injecting a fluorescent tracer into anesthetized fish, imaging them, and analyzing their bladder behavior after exposure to several clinically relevant medications. During this summer rotation, the selected medical student will engage in basic science studies about zebrafish and vertebrate bladder physiology. The project be tailored to the medical student’s previous research experience (which may be none), skills, interests, and abilities. Some possible activities could include python programming, image analysis, microscopy, animal husbandry, RNA-seq analysis, spatial transcriptomic analysis, bladder physiology measurements and analysis. The technique and scope of the project will be customized to be completed in 4-5 weeks with time reflect and report their findings.

**Section of Pediatric Surgery, Department of Surgery**

**Reto Baertschiger, MD**

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The division of pediatric general surgery would like to welcome a summer student to be part of our division and participate in one or several research projects.

We will have opportunities to work on three different projects including pediatric general surgery, pediatric surgical oncology and pediatric trauma care.

1. Pediatric General Surgery:

Appendicitis is one of the most frequently diagnosed surgical problems in children. We have identified that certain bacteria cause more complication in children with perforated appendicitis in children in an unpublished performed in 2018. Briefly, *Streptococcus anginosus (SA)* is contained in a subgroup of normal gut flora with pathogenic propensity toward abscess formation. The aim of this study is to expand the previously gathered data on children with perforated appendicitis from 2012-2017 to 2018-2024 and to evaluate the clinical significance of SA in the setting of appendicitis at our center.

**Methods:** This is a retrospective cohort study at DHMC. Patients will be identified by ICD 9/10 code diagnosis of acute perforated appendicitis from 2018-2023**.** Medical charts will be reviewed to confirm clinical evidence of appendicitis and patients needed to have a corresponding intra-abdominal or pelvic fluid culture. Patients with positive culture for SA (SA(+)) will be compared to those with negative culture (SA(-)), and followed for a minimum of 6 months. Primary outcomes of interest will be disease severity, including complications, readmission, length of stay (LOS), and duration of antibiotics.

We anticipate 150-180 additional patients to be included in the study.

1. Pediatric Surgical Oncology:

Trisomy 18 is a severe chromosomal abnormality in children. These children survive and are at risk of developing renal and liver tumors. We plan to participate in a mutli-institutional study analyzing the outcomes for Patients with Trisomy 18 and Nephroblastoma or Hepatoblastoma: a Retrospective Review project. We will include at least two of our patients, after IRB approval. We will collect the data, including demographics, surveillance data, diagnosis and treatment information as well as long term follow-up.

1. Pediatric Trauma:

Children, particularly during adolescence, are among the most frequent victims of traumatic injury in North America. In the United States, 7,444 children aged 0-19 died due to unintentional injury in 2019 for an average of 20 preventable deaths per day. Unintentional injury is also among the leading causes of pediatric presentation to the emergency department with more than nine million initial emergency room visits annually. Beyond the harm of the initial injury itself, traumatic injury in children also carries significant risks of long-term physical disability and chronic pain, as well as the development of psychologic illness such as post-traumatic stress disorder. Furthermore, trauma is not always an isolated event and can put adolescents at risk for future injuries. Indeed, teenagers over the age of 14 who experienced a significant traumatic event have been found to be as much as ten times more likely than others to have a subsequent trauma.

We propose to study and better understand the causal attributions which adolescents hold from their traumatic injuries and to establish how these attributions might relate to injury prevention strategies for these children. We plan to use a mixed method model of surveys and structured one-on-one interviews to interact with participants. Our ultimate goal is to use our findings to construct injury prevention messages and strategies that will appeal to adolescents more directly than those created by adults only.

**The student duties and involvement:**

The selected student will participate in data collection, data analysis and manuscript drafting on one or multiple projects. The goal is also to submit an abstract to a local and hopefully national conference. The student will be required to take the CITI Good Clinical Practice in research course, as requested by our IRB. The student will also be able to participate in our tumor board, regular learning opportunities such as grand rounds and divisional education opportunities – case discussions, journal club etc.

**Section of Urology, Department of Surgery**

**Florian Schroeck, MD, MS**

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The student will be involved in research activities related to improving care for non-muscle invasive bladder cancer. This might involve working with existing quantitative or qualitative data or being involved with an ongoing clinical trial.

Further information on the projects can be found here: <https://www.hsrd.research.va.gov/research/abstracts.cfm?Project_ID=2141707037> [hsrd.research.va.gov]

And here:

<https://prevention.cancer.gov/funding-and-grants/funded-grants/R37CA275916> [prevention.cancer.gov]

Depending on interest and timing, the student will get experience in participant recruitment, data abstraction/collection, qualitative or quantitative data analyses, literature search related to the project, or drafting of presentations, abstracts, or manuscripts related to the research. It is important to note that a commitment is needed at least 3 months prior to the start of the summer break, so that we can assure all necessary training and privileges are in place for the student to get access to VA data and participate in VA research activities.

**Section of General Surgery, Department of Surgery**

**Meredith Sorensen, MD, MS**

Meredith.J.Sorensen@hitchcock.org

**Perioperative Patient Portal Use and Anxiety: A Study of Thyroid Surgery Patients**

The purpose of this study is to understand perioperative portal use among patients who undergo thyroid surgery and explore its relationship to perioperative anxiety.  We hypothesize that patients who access the portal more frequently, or who use internet sources or seek advice from non-medical personnel to address their questions or concerns, will report increased perioperative anxiety compared to their counterparts.  Studies to date have examined the evolution of patient use of patient portals both in the inpatient and outpatient settings and the rendering of patient care by surgeons via these portals. There is a dearth of information, however, related to portal use and its relationship to perioperative anxiety.

The study will involve a single, in-person survey filled out by the patient at the time of their post-operative follow up after thyroid surgery.  The objectives are: To understand the relationship between portal use and patient anxiety in the perioperative period, to understand how patients resolve questions and concerns that arise during the perioperative period, and to uncover differences in portal use and perioperative stress between patients who undergo thyroid surgery for benign vs. malignant pathology.

The student’s role in this project will be to help with IRB modifications (this is written as a paper study, but we may investigate the feasibility of transferring it to a portal-based survey).  Data collection can start before the summer, but in order to accrue enough patients, the project may need to extend beyond the summer.  The student will be involved in data analysis.  For first authorship, the student would need to take charge of the project, to include authoring an abstract for submission, creating a poster/presentation if accepted, and drafting the manuscript.

**Patient Perceptions of Surgical Residency Training (this is a collaboration with Vanderbilt)**

There are innumerable complexities that patients face when navigating the medical setting. One of these complexities is the integration of resident training and patient care at academic medical centers. Patients overwhelmingly do not understand the education, roles, and responsibilities of the members of their medical team. Unfortunately, while most patients feel it is important to help train the next generation of physicians, many do not want trainees participating in their procedural and/or surgical care. Previous work has demonstrated that patients may be more open to trainee participation in surgical care after learning about trainee education, roles, and responsibilities. We hypothesize that patients will be more willing to allow trainee participation in their surgical care after reflecting on their own experiences with a procedural learning task (i.e. learning how to drive). We will recruit approximately 40 patients who are scheduled to undergo elective surgery to undergo semi-structured interviews. Patients will be randomized into control and intervention arms. Participant in the control group will be subjected to a semi-structured interview about their experiences with and expectations for trainee participation in surgical care. Participants in the intervention group will be subjected to the same semi-structured interview but will also be engaged in a discussion about the similarities between learning how to drive and learning how to perform operations. Transcripts from all interviews will be transcribed and then subjected to both thematic and statistical analysis.

The student’s role in this project would likely be with conducting the interviews and then participating in the coding process and thematic analysis.  For first authorship, the student would be expected to author the abstract, create the poster/presentation if accepted, and draft the manuscript.  This project is likely to extend beyond the summer, though it may be possible to at least complete the interviews in the summer timeframe.  Some of the Dow funds would need to be used for transcription.

**Section of Minimally Invasive Surgery, Department of Surgery**

**Ted Trus, MD**

Thadeus.L.Trus@hitchcock.org

We have seen a lot of variability in paraesophageal hernia repairs recently given the number of surgeons now doing these and the different approaches used including robotic and laparoscopic approaches. We propose to review our institutional data to evaluate the relative benefits, risks, costs and outcomes of each surgical strategy. This is a straightforward project with a quick path to publication.

Review of this data has 3 primary benefits; QI work is necessary to identify areas for improvement as an institution, comparisons or robotic vs laparoscopic approaches are underreported, and costs for each approach are not well documented.

I will work directly with the medical student to collect, analyze and review the data and to write abstracts, posters or papers resulting from this work.

**Section of Vascular Surgery, Department of Surgery**

**Jesse Columbo, MD**

Jesse.a.Columbo@hitchcock.org

Dr. Columbo is an early career vascular surgeon at Dartmouth-Hitchcock, where he also completed his residency in vascular surgery. He holds appointments at both the Geisel School of Medicine at Dartmouth, and at The Dartmouth Institute. He works with students in a variety of ways. He is an active preceptor for the On Doctoring program, is the clerkship director for the third-year rotation in vascular surgery, and serves as co-mentor to PhD students. Students working with Dr. Columbo will participate in one of his active ongoing research projects (see below), where the student would have the opportunity to work on existing projects, including data collection, data analysis, and abstract and manuscript preparation, depending on the interests of the student. In addition, students will have the opportunity to be embedded in an ongoing research effort that includes weekly meetings with research fellows, PhD candidates, biostatisticians, and economists.

1. **Studying stroke after carotid revascularization**

Carotid revascularization surgery, including carotid stenting and carotid endarterectomy, are some of the most common procedures performed by vascular surgeons in the United States. There is ongoing debate regarding a variety of aspects in the management of these patients, including what type of surgery patients should undergo, whether they should undergo surgery at all, and how they should undergo surveillance. Addressing these questions is a primary focus of Dr. Columbo’s research efforts. Example publications: PubMed IDs: 36172943; 31941366; 29914828; 28190714; 33616666

1. **Patterns of stress test utilization before vascular surgery**

The use of preoperative stress testing for cardiac risk-assessment before vascular surgery is highly variable. Despite recommendations from the American Heart Association and American College of Cardiology, testing demonstrates wide variation across centers, with little differences in the baseline characteristics of patients. Dr. Columbo is investigating the impact of this variation, and ways to reduce it. Example publications: PubMed IDs: 36036487; 33684471; 32247699

1. **Reintervention and aneurysm related mortality after endovascular abdominal aortic aneurysm repair**

Abdominal aortic aneurysms are a common diagnosis among vascular surgery patients, and endovascular abdominal aortic aneurysm repair is one of the most common procedures performed by vascular surgeons across the world. Patients who undergo endovascular surgery (minimally invasive repair with stent-grafts) as opposed to traditional open replacement of the aorta, are subject to a variety of important considerations. These include the risk for reinterventions to shore up the aneurysm, and the feared complication of late aneurysm rupture related to failure of the implanted graft. Measuring these complications and defining their risk factors is an important component of quality assurance for patients with abdominal aortic aneurysms. Example publications: PubMed IDs: 36283705; 36036487; 35090989; 35090992; 31290764; 32150470; 31471231

1. **Development and use of advanced biostatistical methods to study outcomes in surgical care**

Sometimes existing biostatical methodology is limited in its ability to address certain research questions. These include but are not limited to, situations with time-variant exposures (such as repeated measurements of carotid ultrasound prior to surgery), or situations where a randomized controlled trial is not possible or unlikely to happen in the near future (such as with transcarotid artery revascularization versus transfemoral carotid artery stenting). In these situations, advanced methods can improve upon traditional strategies for risk adjustment, allowing enhanced inference and stronger validity of study findings. Dr. Columbo works closely with a group of biostatisticians and economists who investigate novel applications and methods to address these challenges. Example publications: PubMed IDs: 36172943; 33616666; 31165658; 30354571; 30646140

**Section of Vascular Surgery, Department of Surgery**

**Rebecca Scully, MD**

Rebecca.E.Scully@hitchcock.org

1. **The impact of patient sex/gender on endovascular aneurysm repair outcomes and postoperative surveillance**

Sex-based differences in outcomes after endovascular aortic aneurysm repair (EVAR) for abdominal aortic aneurysms (AAA) have been noted with women experiencing increased mortality and increased re-intervention rates over time. The goal of the project is to evaluate differences in adherence to recommended post-operative surveillance protocols between male and female patients and to determine if such disparities impact EVAR outcomes. The project is an opportunity to work with data from the Vascular Quality Initiative (VQI) dataset and to work with health services researchers in the Department of Surgery and within the Heart and Vascular Center.

2. **Gender-based differences in compensation model preferences among surgeons**

Differences in compensation between male and female physicians is a well-established issue however physician preferences around compensation models based on gender are less well understood. Data surrounding best practices to address and close the gender pay gap are also lacking. Using a mixed methods approach, the goal of the current work will be to design and distribute a survey and to also perform structured interviews with early, mid, and late career surgeons employed under a variety of compensation models.

**Section of Vascular Surgery, Department of Surgery**

**Philip Goodney, MD, MPH**

**David Stone, MD**

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Drs. Goodney and Stone have collaboratively mentored Geisel students in health services research in topics related to surgical care, especially vascular care, but other topics have been investigated as well. These projects range from case series, to large observational analytic projects, to literature review/meta analyses, as well as methodologic and developmental projects. Students interested in this work can read more at www.dartmouthcesc.org, www.mdepinet.org/vision-crn/, and www.vaoutcomes.org. Partnership with Drs. Sandra Wong, Andrew Loehrer, Joga Ivatury, Florian Schroeck, Alex Iribarne, and other surgical health services researchers in the Department of Surgery and Heart and Vascular Center are included in these summer research experiences. Students will be assigned a role in an existing project of their choosing, report their findings at the end of the summer experience, and share their work in regional and national meetings and publications.

**Section of Neurosurgery, Department of Surgery**

**Jennifer Hong, MD**

Jennifer.Hong@hitchcock.org

Project 1: **Understanding the relationship between interhospital transfer and surgical outcomes.**

This is a clinical research project that builds on earlier work which discovered that patient outcomes for acute surgical diagnoses are worse for patients who are transferred from outside hospitals compared to those who present primarily to the emergency department, even after adjusting for other predictors of poor outcome such as disease severity. I am interested in analyzing data from national and institutional databases to better understand why inter-hospital transfers are associated with poor outcome and to identify ways to improve the mechanisms for transfer in healthcare delivery. This is particularly important in rural academic healthcare systems which have a high rate of transfers. A student who is involved in this project would be working closely with me to review patient charts, plan analyses and write and present findings.

Project 2: **Pten deletion to accelerate peripheral nerve regeneration**

This is a translational research project, using an animal model for nerve regeneration (the mouse sciatic nerve), to assess the effects of Pten deletion to accelerate nerve growth after injury. I use viral-mediated gene therapy approaches to conditionally inactive Pten in peripheral nerves. The goals of this student project are to 1) assess viral (AAV) infection rates in mice, 2) analyze live-imaged primary neuron cultures, and 3) perform detailed behavioral analyses in mice to assess sciatic nerve function. A background in basic science research is preferred, but I will directly supervise and train any student.

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**Assessing and improving communication among clinical staff members within an outpatient ambulatory service center.**

Communication between clinical staff and the patient is of great importance in modern clinical medicine. However, communication efficiency and methods among staff members are rarely studied or assessed as part of the clinical workflow, particularly in an outpatient environment. This is likely due to a lack of awareness of the protocols and structures available, generalizability of such investigations beyond the clinical environment in which it had been studied, or a lack of time available to the clinical staff to perform such investigations. In order to be up to date and efficient in modern healthcare delivery, assessing how staff members communicate is vitally important not only for patient satisfaction, but also staff satisfaction and retention of the workforce.

The medical student will work with our leadership team, clinicians, nurses and other clinical staff to assess the current state of how we utilize communication for patient care. This will include, but will not be limited to, electronic medical record messaging, phone calls, and peer-to-peer in-person discussions. The student will also play a pivotal role in researching and presenting solutions available currently in the literature and challenges and barriers observed through their observation of how communication is conducted within our clinic. Lastly, the student will help create a process of implementation of solutions and observe the results of such implementation.

Faculty contact:

J. Henry Feng, MD MPH – Clinical Assistant Professor of Medicine, Department Chair

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Administrative contact:

Constance McCoy, RN – RN/MA supervisor

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Department of Primary Care

Dartmouth Health – Concord

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Please find our project information below (combining engineering and medicine):

* Faculty contact name and email address: Katie Hixon (Katherine.r.hixon@dartmouth.edu)
* Administrative support contact name and email address: Michaela Vispo (Michaela.Vispo@dartmouth.edu)
* Department name: Thayer School of Engineering (Biomedical Engineering)
* Project title and description:

**Creating a pre-vascularized multi-component scaffold for bone tissue engineering**

Our project aims to improve bone regeneration by leveraging tissue engineering techniques. Building upon the proven advantages of cryogels and 3D-printed scaffolds, our research will address the complex challenges of large-scale tissue defects, particularly in maxillofacial repair. Our prior research demonstrated the efficacy of integrating cryogels and 3D printed scaffolds which yield microstructures that mimic the natural bone environment and fill large tissue voids. Moreover, investigations by our partner lab have shown the feasibility of in-vitro vascularization within hydrogel scaffolds.

In this project, we propose a novel approach that combines cryogels (optimized for bone cell infiltration), hydrogels (tailored for pre-vascularization), and 3D printing technology (providing structural support). By integrating these components, we aim to replicate the properties of autologous bone grafts while reducing their drawbacks. Our strategy holds significant promise for advancing maxillofacial defect repair, offering an alternative to conventional grafting techniques. Our goal is to promote bone regeneration and accelerate healing processes, ultimately improving patient outcomes and quality of life.

* Indicate whether you are providing funding: no

**Katie Hixon, Ph.D.**

Assistant Professor of Engineering
Thayer School of Engineering at Dartmouth

Please find our second project information below (combining engineering and medicine):

* Faculty contact name and email address: Katie Hixon (Katherine.r.hixon@dartmouth.edu)
* Administrative support contact name and email address: Michaela Vispo (Michaela.Vispo@dartmouth.edu)
* Department name: Thayer School of Engineering (Biomedical Engineering)
* Project title and description:

**Tissue-Engineering to Induce Human Skin Attachment and Expansion for Transplantation**

Skin grafting is incredibly common, where over 160,000 skin grafts are used each year in burn patients alone. With the use of skin flaps and grafts as the gold standard for closure of complex wounds, complications can occur including bleeding, infection, necrosis, distortion of free margins, and disrupted appearance, highlighting a need for improved patient-specific treatment options. The field of tissue engineering has evolved to combine biomaterial scaffolds, cells, and bioactive factors for targeting the growth and regeneration of new tissue. This research has greatly expanded over the past decade, targeting a range of tissue types, including skin. Despite the many advances in tissue engineering scaffold fabrication, no work has optimized a method to adhere patient biopsies to scaffold matrices, acting as both a vehicle for surgical implantation and subsequently encouraging expansion of the biopsy to cover a large volume of tissue while retaining patient and surgical site-specific color and texture. Through the integration of patient skin biopsies with tissue-engineered electrospun scaffolds, a well-characterized fiber matrix that has been previously shown to encourage skin growth, this study will target the ability to create clinically relevant constructs that encourage tissue regeneration following a typical dermatological procedure. We hypothesize that (i) human skin biopsies will directly attach to a tissue-engineered electrospun scaffold while retaining cell morphology and function and (ii) the expansion of human skin biopsies on tissue-engineered electrospun scaffolds will provide patient-specific skin closure alternatives. Data collected during this pilot study will advance scaffold fabrication capability to increase knowledge of material integration, posing as the basis for future studies in the modulation of tissue/material interaction in disease.

* Indicate whether you are providing funding: no

**Section of Gastroenterology and Hepatology**

**Tim Gardner, MD, MS**

**timothy.b.gardner@hitchcock.org**

**Project 1:** The project is a retrospective chart review study already approved by the DH-IRB to evaluate the rate of colonoscopy polyp detection based on the type of anesthesia used during the colonoscopy. The student will evaluate patient charts and colonoscopy reports from several providers performing colonoscopy at both DHMC and APD. This can be a remote or in-person opportunity and this work is expected to generate a second author publication for the student with the possibility of spin-off projects that could lead to primary investigator publications. This would be an ideal project for a student who would like to work remotely this summer and is interested in gastroenterology, general surgery or oncology.

**Project 2:** This project is a retrospective chart review study that seeks to evaluate the risk of progression of pancreatic cysts into pancreatic adenocarcinoma. Patients with proven adenocarcinoma from 2013-2023 will be evaluated for the presence of a pancreatic cyst on imaging, pathology, and cytology prior to their diagnosis. There are multiple possible projects related to the dataset and the project is already IRB approved and data evaluation ongoing. This would be an ideal project for a student who was interested in gastroenterology, general surgery, surgical oncology, pathology or oncology.

**Project 3:** This study is for students interested in medical education who would like to assess the impact of a medical student research website on overall satisfaction with their medical student research experience. This would likely be a survey study done with fellow students and evaluating past student experience with the research program at Geisel.

All of these projects can be funded with Geisel student research money ~$2500. Dr. Gardner’s research fund will pay for conference attendance.

**Faculty Contact:**

Cassandra M. Godzik, PhD, APRN

Nurse Scientist, Research Fellow

Psychiatric Mental Health Nurse Practitioner

**Faculty Telephone:**

+ 1 (802) 558-3439

**Faculty Email Address**:

cassandra.m.godzik@dartmouth.edu or cassandra.m.godzik@hitchcock.org

**Administrative Support Contact:**

Same as faculty contact

**Department name:**

Department of Psychiatry

**Project title and description**

This summer research position would involve work on the following two projects. Responsibilities will include general research assistant duties and secondary data analysis.

1. Moral and Social Healing in Medicine: This project involves identifying pathways to reducing harms from the ethical dilemmas and Potentially Morally Injurious Events (PMIEs) that healthcare workers encounter in the workplace. Understanding PMIEs and developing interventions may help to mitigate the harmful psychological and emotional effects events are having on our ability to maintain a healthy healthcare infrastructure that can provide high quality care.
2. Sleep Measurement Tool Development: This project involves the development and validation of a sleep environment measurement survey. This screening tool would allow clinicians to identify adverse home environment factors which may be contributing to insomnia symptoms. Follow-up projects will focus on the creation of interventions to eliminate or decrease the negative effects of these factors.

**Providing funding:** No

Larry Myers. PhD

Lawrence.c.myeres@dartmouth.edu

The purpose of the project is to create a mobile App that allows students in clerkships to rapidly connect common clinical presentations (in the clerkships or elsewhere) to any underlying biochemistry or genetics through various differential diagnoses.    Student researchers will work with project team on re-formatting content, already created by a team of medical biochemical educators from different institutions, for the App and ultimately testing and refining the App.  The development of the App itself will take place in collaboration with an outside freelance developer.   The position starts immediately and will end on June 30, 2024.  Students will be paid <$20/hr> an hour and will be expected to submit a weekly timesheet.  It is estimated that there will be approximately 18 hrs of student work associated with this project in total.  Work can be performed remotely and does not have fixed mandatory hours.  Contact Larry Myers <larry.myers@dartmouth.edu> for more information

**Qualitative Grading Practices Study**

With the proliferation of pass-fail grading practices in both the pre-clerkship phase of medical school and the STEP 1 exam, a national discussion is underway about fairness and transparency of medical school grading practices. Building upon a survey study exploring grading practices, the purpose of this current study is to interview preclinical curricular deans at medical schools across the country about their remediation and reporting practices. We are seeking a student to assist with qualitative data analysis and management. This is an excellent opportunity to learn about qualitative research practices. The position starts immediately and will end on June 30, 2024. Students will be paid $25/hr and will be expected to submit a weekly timesheet. Contact Dr. WIlliam Eidtson <eidtson@dartmouth.edu> for more information.

* **Faculty name and email address:** Yue Yan, yue.yan@dartmouth.edu
* **Administrative support contact name and email address:**Charles R. Thomas,Charles.R.Thomas@Hitchcock.ORG
* **Department name:** Radiation Oncology and Applied Sciences
* **Project title:** A super-resolution network to improve the image quality of the MRI-guided Linac system for pancreatic cancer
* **Project Description:** Magnetic Resonance Imaging (MRI) stands apart from traditional imaging techniques like computed tomography and ultrasound due to its versatility and unique capabilities. The advent of advanced MRI methodologies opens transformative avenues for radiation therapy (RT), particularly in dynamically monitoring both target definition and changes in radiation throughout the treatment course. However, real-time MRI applications in RT currently face challenges, such as low image resolution and significant artifacts from treatment gantry movement. In this project, we aim to harness advanced machine learning techniques to enhance image resolution and reduce MRI artifacts during treatment. We seek a student with proficiency in Python and deep learning platforms like PyTorch to develop and train a machine learning model that will enhance MRI utility for our pancreatic cancer patients.

**Indicate whether you are providing funding:**Yes, $1,500 stipend will be provided.

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**Faculty: Lara Goitein DHMC Pulmonary/Critical Care**

**Contact: lara.goitein@hitchcock.org**

 I have a project that I could really use some help on from 1-2 medical students this summer, and a couple of people have suggested I reach out to you for advice.  In my work for the Value Institute, I’m designing our system approach to preventable mortality reduction.  As part of that work, I’ve started a scoping literature review to find all interventions associated with a statistically significant reduction in inpatient or 30-day mortality, in level-1 evidence.  Believe it or not, to my understanding, this has not been done before.  I think it would be of great interest to the many hospitals trying to improve CMS Star Ratings and designing their mortality-reduction programs.

I’m looking for two smart medical students who might be interested in helping me with this scoping review over the summer.  It would mean working with our librarian, writing and registering a scoping review protocol, using Rayyan software, and going through a total of about 6000 article titles/abstracts to see which fit criteria for the review.  Somewhat tedious, but interesting in that it gives a real overview for what medical interventions actually move short-term mortality (spoiler alert:  there aren’t many!).  Also interesting in that it has real-time practical applications for our system quality work.  Depending on how far we got how quickly, the students could also help me with a deeper review of articles meeting criteria and manuscript preparation.  I think there is a high chance for a publication coming out of it.  I would provide support/mentorship, and the training to be able to recognize appropriate study design.