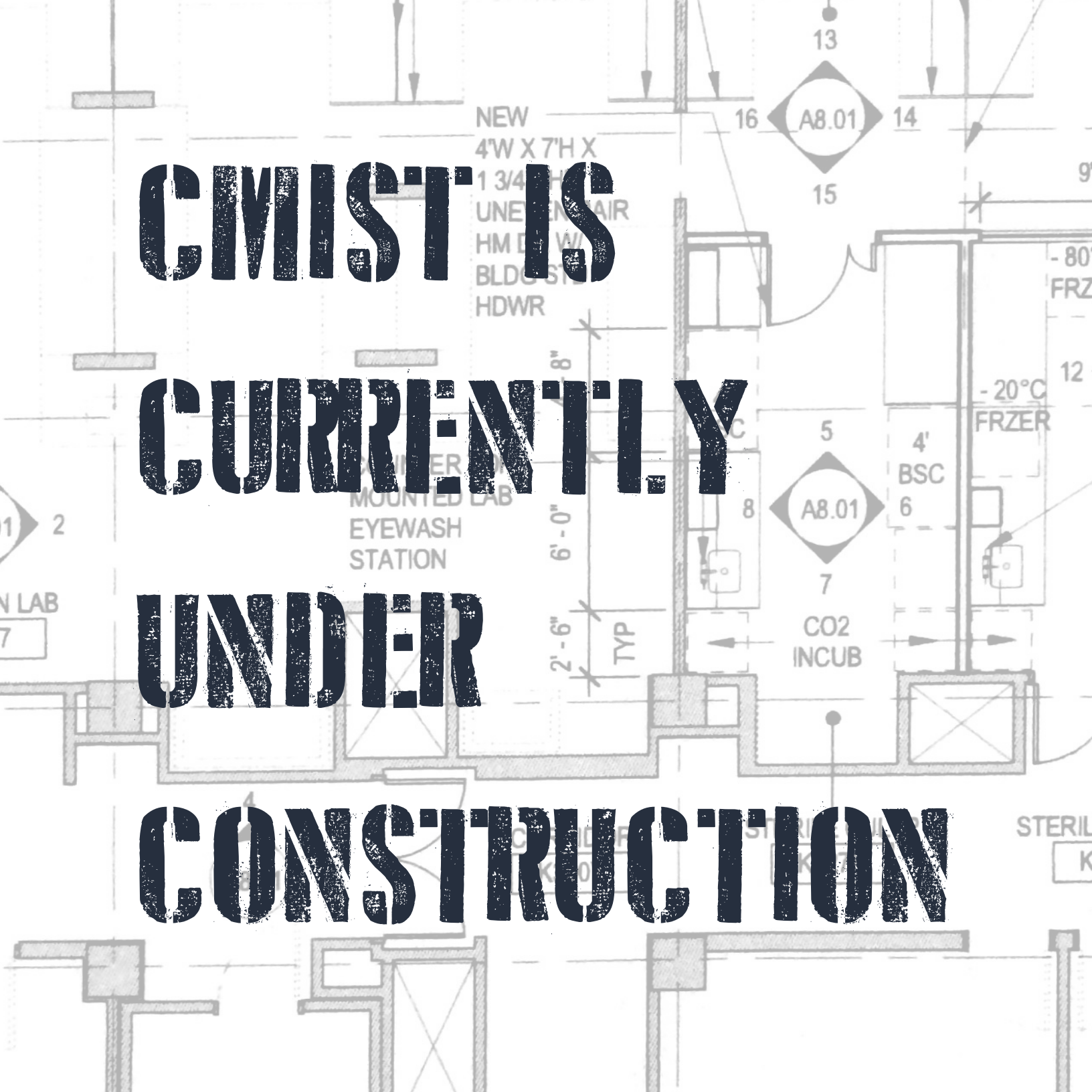

CMiST
center for microbiome sciences & therapuetics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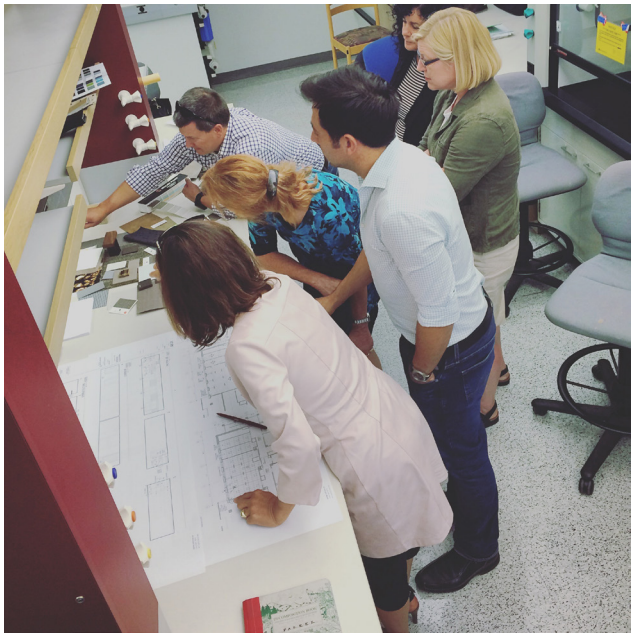


A note from Will

Our “look”

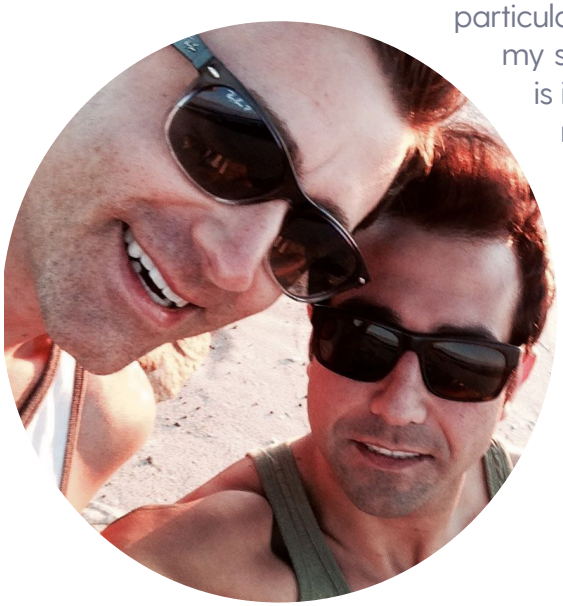
Innovation Services

Art+Science

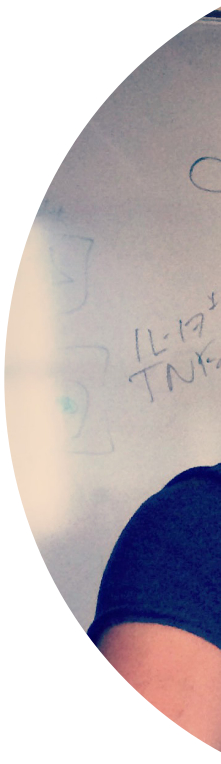
A note from Will

There is an entire ecosystem of bacteria, fungus and virus that resides within each of us. This complex community of microbes who call our intestines home is collectively referred to as the microbiome. As scientists and clinicians uncover more about the biology of the microbiome we are finding that changes in this community may have a role in causing or worsening intestinal diseases such as Inflammatory Bowel Disease (IBD), diabetes, and gastrointestinal cancers, and even neurological diseases like Autism and Multiple Sclerosis. We are just beginning to scratch the surface in the understanding of the microbiome and its role in disease. It is my belief that this microbial world harbors a number of important potential discoveries that can help us treat these diseases.

These next few pages will introduce you to the work that my laboratory is pursuing, research that I feel is important, thoughtful and will one day bring real solutions to complex diseases. I believe firmly in transparency and openness, particularly in science. But before you continue reading about my scientific endeavors, I would like to introduce myself. It is important to me that you know a little about who I am not only as Dr. William DePaolo "the scientist," but also as Will, a son, a brother, a husband and a friend.



I was born in Portland, Maine into a large Italian-American Family. Being only third generation American those strong Italian traditions of family are ideals I still hold very close. I grew up in the kitchens of my grandparents. If I wasn't helping out at my



grandfather's pizzeria then I was in the kitchen with my grandmother making spaghetti sauce. I remember how they always told me that I had to go to college, that I had to become educated so that unlike my family who came to America, poor and struggling, I could have a strong future. These memories did inspire me to go to college, to become the first DePaolo to get a college degree and then the first DePaolo to get a PhD. None of my grandparents were able to celebrate these accomplishments with me. I lost all four of my grandparents to cancers and heart disease and diabetes before I graduated from college. I lost them to diseases that should be treatable, that we should be able to cure.

I was one of those loud, talkative, curious children who was always less interested in what they were supposed to be doing, and more interested in how what they were supposed to be doing was going to affect activities the next day after. I grew up to be a loud, talkative, curious adult who is also more interested in how today's findings will impact science or life in the future. I have always been a talker, I used to talk so much that my school teachers would send me home with my unfinished lunch and notes saying "Your son did not eat lunch today, he was too busy talking," or would make me stand against the wall at recess because I was distracting other students during class. I still talk a lot, but found that I also listen, and I am able to relate to those people around me. As an adult this skill has allowed me the opportunity to establish important connections, to bridge different disciplines in science, and to initiate fruitful collaborations that otherwise may not have occurred. In the end, I guess all of that time in the kitchen with my grandparents, all of those recesses I was made to stand against the wall for talking during class, and all of those uneaten lunches shaped a scientist and as a man.

-Will

Our “look”

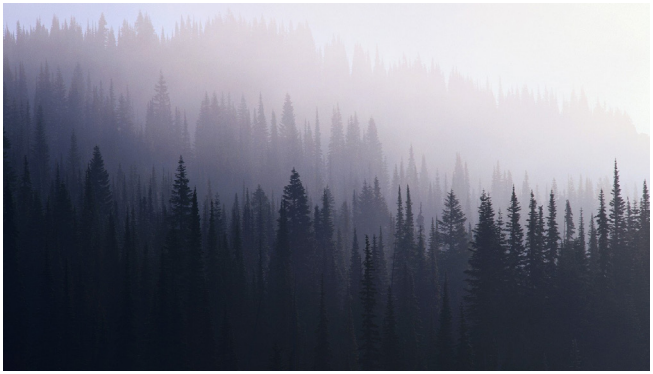
The CMiST look starts with the strong, smooth and warm lines of the Greycliff font family, primarily light, medium and demi bold.

Greycliff Light & *Light Oblique*

Greycliff Regular

Greycliff Medium

Greycliff Demi Bold



The colors of CMiST come from an iconic photograph of early mornings here in the Pacific Northwest. This image captures the beauty of the landscape, “purple mountain majesties,” and evokes feelings of wonder and a desire to discover.

C=16 M=16 Y=6 K=0

C=46 M=42 Y=22 K=0

C=72 M=60 Y=38 K=16

C=82 M=72 Y=51 K=51

C=84 M=73 Y=57 K=70

university of washington

center for microbiome sciences & therapeutics

www.cmist.washington.edu

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(under construction)

Innovation Services

Microbial Isolation & Cultivation

With this service, we will synergize with existing resources within the University of Washington, Department of Medicine, to establish a unique set of tools and reagents that can be used by clinicians and researchers to address the complex relationship between intestinal microbiota and host tissues in diseases such as Inflammatory Bowel Disease (IBD).

Specifically, we will:

Isolate bacterial species within the microbiota of patient samples using standard culturing paired with automation.

Identify isolated bacteria using MALDI-TOF mass spectrometry.

Establish a repository for clinical and research isolates obtained from patients and healthy controls.

Link isolates to clinical patient data and/or existing tissue in the GI biorepository, which will enable investigators to study the disease phenotype, tissue status and bacterial response from the same patient.

Cultivate and prepare isolates and/or commercially available probiotics strains for in vivo and in vitro testing.

Provide resources and training to investigators who want to expand their microbiology programs.

Equipment & innovations:

Shellab bactron anaerobic bacterial chamber, MALDI-TOF mass spectrometer

Bruker MALDI-TOF microflex™

Matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) is a technique used in mass spectrometry that allows for the analysis of both biological molecules (such as DNA, proteins, peptides and sugars) and large organic molecules (such as polymers, dendrimers and other macromolecules). Though the MALDI-TOF microflexTM is fairly compact, just a little bigger than a PC tower, its capabilities are huge. With this piece of highly specialized equipment, we will be able to identify single bacterial species in just a few minutes.

Shellab BACTRON900 anaerobic chamber

With the capacity to house 900 plates, the BACTRON900 will allow us to successfully cultivate a number bacteria species, often difficult to grow, that live only within the confines of our intestine.

Host & Microbe Interaction

With this service, we will explore the immunological and genetic consequences of the microbiome when in contact with human cells. Normally, we co-exist with the 100 trillion bacteria that call our bodies home. However, genetics and/or extrinsic factors (e.g. infection, diet) can influence this relationship and cause changes leading to the development or exacerbation of inflammatory intestinal diseases. Understanding the complex tug-of-war between host and microbe is critical in our ability to develop therapies to treat disease.

Specifically, we will:

Provide functional assays examining the response of human cell lines and human/mouse organoid cultures against purified bacterial isolates, metabolic by-products and/or mixed bacterial populations from stool.

Screen potential drugs and microbiome-derived biotherapeutics using functional assays.

Generate or acquire fluorescent probes against specific bacterial members of the microbiota in order to visualize their relationship with each other as well as with the intestinal tissue using fluorescent microscopy.

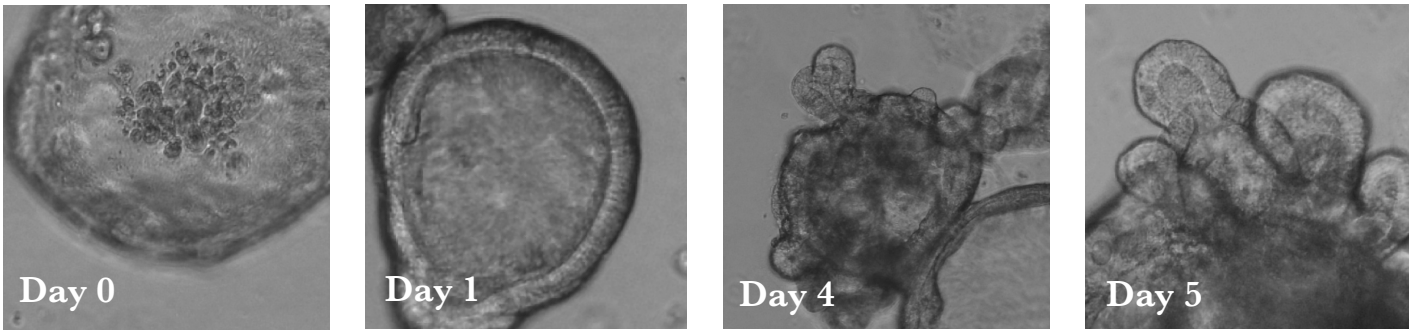
Determine gene inductin of host and microbiota using fluroesceng microscopy paired with laser capture technology.

Equipment & innovations:

Novel assays, Leica fluorescent microscope, organoids developed from IBD and healthy intestinal tissue, 16S fluorescent in situ hybridization (FISH)

Organoids

With just a tiny tissue sample, we have the ability to actually grow three-dimensional intestinal organoids or "mini-guts" as they are known here in the lab, in less than a week. These mini-guts retain key features of the intestinal epithelium, including all of the major epithelial cell types, making them an ideal tool to help us isolate and understand the different mechanisms at play in IBD versus healthy intestinal tissue.



Novel functional assays

–omics data predicts biological "function" of the microbiome based upon theoretical models, which may potentially ascribe incorrect characteristics to a community. Our lab has developed assays that can determine the immunological signature induced by the microbiota. These assays can also be used to test potential biotherapeutics or synthetic drugs on blocking microbiota-host immune interactions.

Other equipment available

LI-COR Odyssey CLx Imaging System

The Odyssey CLx Imaging System utilizes near-infrared fluorescence (NIR) light, a relatively recent optical imaging method, to provide digital images that are at both consistent and reproducible. Because this imaging technique offers great sensitivity, it produces images of very high quality, giving us the ability to confidently analyze samples more clearly and completely.

Two OMNI Bead Ruptors

The OMNI Bead Ruptor is simply a bead mill used to homogenize tissue samples for molecular extraction. While simple in function, it is the most advanced homogenizer on the market. With the capacity to hold 24 samples at once, the Bead Ruptor gives our researchers the ability to grind and lyse samples effectively and efficiently.

CMiST Associated Facilities and Services

GI Division biorepository
Gnotobiotic facility

Art+Science

Microbiome, probiotics and stool transplants have entered pop culture and the mainstream media, but is correct and accurate information being circulated? In an era where Tweets reach hundreds and thousands of people instantly, and where information is at the tip of our fingers, it is critical that the information regarding health, disease and the microbiome come from legitimate sources providing factual information.

We have established a relationship with the renowned USC School of Cinematic Arts and the Roski School of Fine Arts in order to develop programs that can educate local communities about health and the microbiome using art, film and writing. An emphasis of this initiative is to reach under-served populations regarding the importance of the microbiome and nutrition and health.

As part part of our art & science initiative world-renowed bio-artist, Kathy High, will be doing an artisit residency in DePaolo Lab during winter 2016. Kathy has shown her work across the US, as well as Australia, Germany, Poland, Spain, Ireland and the UK, and is a Guggenheim fellowship recipient.

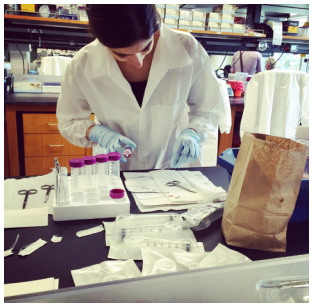
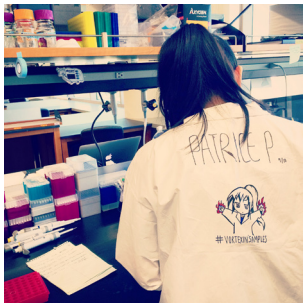

RD FLOOR PLAN

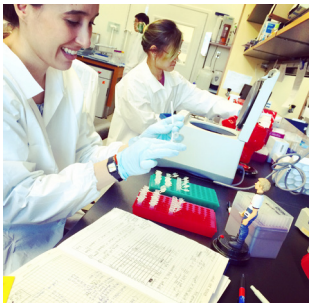
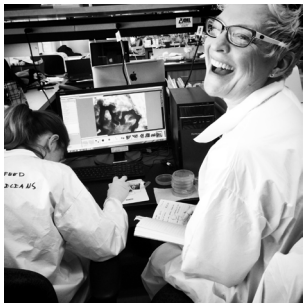
Our Values

think deeply
embrace creativity
cultivate relationships
facilitate discovery

"Don't keep forever on the public road, going only where others have gone, and following one after the other like a flock of sheep. Leave the beaten track occasionally and dive into the woods. 'Every time you do so you will be certain to find something that you have never seen before. Of course it will be a little thing, but do not ignore it. Follow it up, explore all around it; one discovery will lead to another, and before you know it you will have something worth thinking about to occupy your mind. All really big discoveries are the results of thought."

-Alexander Graham Bell



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