Digital Literacy from High School to Residency

Vincent Fu, University of Colorado School of Medicine @vincefox8 | drvincentfu.com





Vincent Fu

University of Colorado School of Medicine Founder & Designer, **arctcf**x



THREE CORE PILLARS





PART ONE

Humble Beginnings

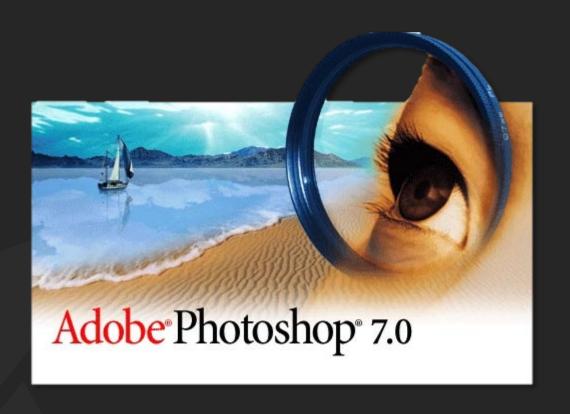


HUMBLE BEGINNINGS

The Early Years 2005-2013



THE EARLY YEARS





THE EARLY YEARS



HUMBLE BEGINNINGS

The Undergraduate Years 2013-2017



THE UNDERGRADUATE YEARS



ADOBE EDUCATION SPOTLIGHT | 2017

Adobe Customer Story

Transferring creative skills to the workplace.

University of Utah graduate finds success in the workplace using skills gained through Adobe Creative Cloud.



"Having access to Adobe Creative Cloud throughout college opened doors for me in ways that I never could have imagined."

Vincent Fu, Digital Marketing Manager, ProLung

SOLUTION

Adobe Creative Cloud

RESULTS



Successfully communicated **COMPLEX** ideas visually



Met any CHALLENGE to contribute to the company



Found success in a competitive **WORKFORCE**



OPENED DOORS to new career options





It's a way of thinking.

VISUAL THINKING IN SCIENCE

LAMININS AS A POTENTIAL ENHANCER OF BETA CELLS





PROLIFERATION AND SUBSEQUENT GENE EXPRESSION FOR THERAPEUTIC TREATMENT OF DIABETES MELLITUS

VINCENT FU, UNIVERSITY OF UTAH; IN ASSOCIATION WITH SYMBIOCELLTECH, UNIVERSITY OF UTAH RESEARCH PARK

INTRODUCTION

Type I Diabetes Mellitus (T1DM), previously known as insulindependent or juvenile diabetes, is characterized by deficient insulin production caused by autoimmune attacks on insulin-producing pancreatic islet beta cells. The mechanism of this autoimmunity is not fully clear nor preventable with current clinical knowledge.

Despite available insulin therapies to reduce the burden of diabetes, many patients still develop complications that compromise multiple organs and ultimately result in early death.

The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014. West Minds 2014

SymbioCellTech has developed a therapeutic that, after a single treatment, has been shown in pre-clinical testing to be a lifelong functional cure for TIDM without immunosuppressive agents or even external insulin treatment. Based on laboratory tests performed both in parallel and as a result of my research at SCT in 2015 and 2016, we have received FDA approval to

SymbioCellTech has successfully combined mesenchymal stem cells with islet cells for our therapeutic.

conduct pilot studies in insulindependent diabetic pet dogs and clinical trials in humans.

The key to successful development of the SCT therapeutic has been to produce islet cells in vitro resulting in a large quantity of cells and cells with high potency, i.e. the expression of relevant genes for curing TIDM (namely insulin, glucagon, and others). These islets are then grown together with mesenchymal stem cells to form "neo-islet" aggregates with properties of both cell types (SymbioCellTech, 2017).

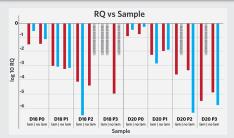
Although islet beta cells are known to be difficult to culture and retain in vitro, a number of studies have demonstrated the enhancing effects of laminins on proliferation rates and potency of cell types that are usually difficult to culture. This led to the hypothesis that growing islet cells in laminin-enhanced cultures will improve 1) proliferation rates and 2) gene expression.

METHODS

Islet beta cells from two dogs that grew well in previous experiments were selected for the treatment. These islets were cultured in parallel in identical culture flasks, half with human recombinant laminin-511 coatings that were manually applied to the flasks prior to seeding. After allowing all cultures ample time to achieve the necessary adhered cell density for passaging (sequential cell expansion), each culture was passaged for about one week per passage. Cultures were passaged continuously until the cells took an extended amount of time to reach ideal confluence, or failed to

reach confluence at all, which usually occurred around the fourth passage. A sample of cells from each culture and passage was prepared for Real-Time PCR analysis throughout the culturing and passaging process, and cell counts were also documented.

Both parts of our hypothesis were thus tested through our parallel culturing protocol. Cell counts and culture expansion rates served as a measure of beta cell proliferation, while the RT-PCR analysis measured gene expression across sixteen canine gene primers.



Proliferation Rate

RESULTS

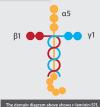
Cell counts were approximately equal between laminin-enhanced cultures and unenhanced cultures. Laminin enhancement only yielded greater cell counts in 2 out of 16 cultures (all grown for 7 days). All other cultures showed slower proliferation rates with laminin.

Gene Expression (above)

RT-PCR data were approximately equal between laminin-enhanced cultures and unenhanced cultures; for each passage, relative quantitation data (above) showed an approximately equal level of insulin (INS) and glucacon (GCG) gene expression between cultures.

OVERVIEW OF LAMININS

Laminins are a naturally-occurring group of heterotrimeric proteins found in the extracellular matrix, and play a major role in forming the basal lamina protein network in the basement membranes of most cells in the body. Colloquially called "the glue of life", they are biologically active, influencing the adhesion, migration, and cell differentiation processes of their surrounding cells.



The domain diagram above shows r-laminin-511, which has been found to enhance growth in mouse embryonic stem cells and thus was hypothesized as an enhancer of islet beta cells in this study.

CONCLUSIONS

r-Laminin-511 does not bear significant benefits or enhancing effects on the growth of our dog islet cultures. In aggregate, the present data demonstrate that there is no statistically significant difference in the growth rate, gene expression, or potency between cultures expanded from the same dog islets, disproving our hypothesis about laminins.



Vincent Fu University of Utah | Department of Biology | v.fu@utah.edu

Study conducted with funding and laboratory assistance from SymbioCellTech, LLC. www.symbiocelltech.com
All dog tissues were the generous gift of Dr. Frank Sachse through an NIH sharing agreement.





HUMBLE BEGINNINGS

Year of Adulting

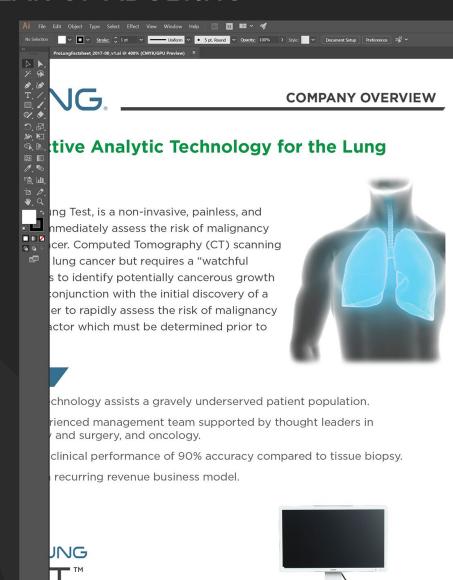
2017-2018







YEAR OF ADULTING





LUNG CANCER OVERVIEW

Lung cancer is the leading cause of cancer death among both men and women. Mortality rates are higher than the next four leading cancers (colorectal, breast, pancreatic, prostate) combined.

Today, only 17% of those diagnosed with lung cancer will survive 5 years. This low survival rate is due, in part to the fact that 85% of lung cancers are diagnosed in later stages.







M

IN

PROLUNG PROLUNG

Late-Stage Diagnosis Survival (Distant Metastasis)

Studies suggest that survival rates can dramatically increase by **at least 38%** with early stage detection. Early detection of lung cancer is the key to making a difference in survivability.

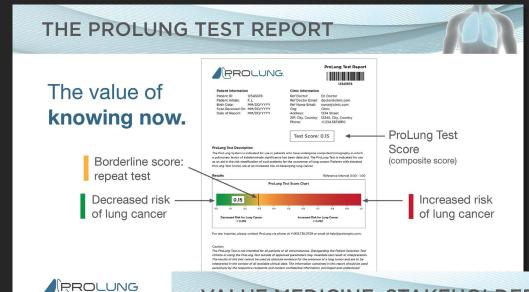


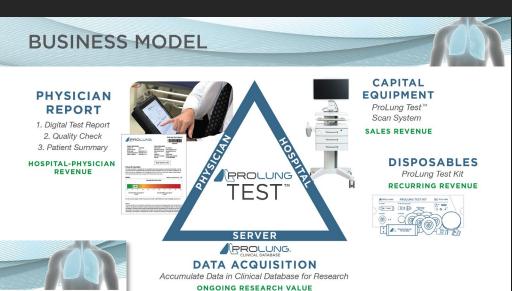
Early Detection





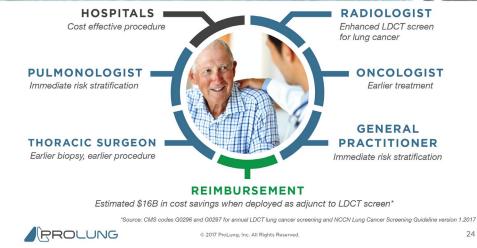
YEAR OF ADULTING





© 2017 ProLung, Inc. All Rights Reserved.

VALUE MEDICINE: STAKEHOLDERS





All this was great, but I wanted to do more.





PART TWO

How It's Going



HOW IT'S GOING

Medical School

2018-present



STILL HOOKED ON ADOBE



DESIGN THINKING IN THE MED SCHOOL CLASSROOM



Three cranial nerves supply motor control to the six

eyelid elevator, and the pupillary constrictor.

extraocular muscles which control the eye, the major

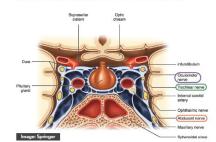
CN IV: Trochlear nerve = Superior Oblique muscle CN VI: Abducens nerve = Lateral Rectus muscle CN III: Oculomotor nerve = all other extraocular muscles

These muscles pull on the globes to direct gaze in every direction and provide coordinated movement.

Relatio



After travelling through the superior orbital fissure in the skull, all three cranial nerves for ocular movement traverse the cavernous sinus near the internal carotid artery and pituitary gland, accompanied by the opthalmic nerve (V1) and maxillary nerve (V2). The sinus, enveloped by dura, is situated superior to the sphenoid bone and inferior to the optic chiasm.



Structural pathologies (e.g. metastases or infections) involving the cavernous sinus may lead to a cranial polyneuropathy primarily presenting with diplopia. Notably, the abducens nerve runs in close proximity to the internal carotid artery, identifying the possibility of isolated sixth nerve palsy due to vascular disease.

AN OVERVIEW OF ANTIDEPRESSANTS

SELECTIVE SEROTONIN REUPTAKE INHIBITORS (SSRIS)

- frequently used as first-line antidepressants - highly effective, tolerable, and generally safe in overdose - potent treatment for anxiety; also effective for panic, OCD, social anxiety, PTSD, body dysmorphia, and eating disorders

PHARMACODYNAMICS selectively increase serotonergic activity by decreasing action of presynaptic serotonin reuptake pumps (60-80%), leading to prolonged

CONTRAINDICATIONS patients with hypersensitivity; patients who have taken a monoamine oxidase inhibitor (MAOI) in the previous two weeks due to interaction with SSRIs; patients taking other serotonergic medications



(escitalopram)









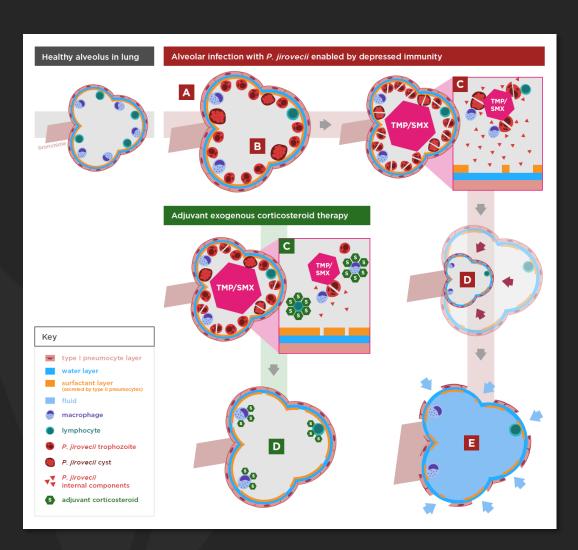
PAGE



- primarily used for depressive disorders and anxiety disorders
- can be effective for body dysmorphia, OCD, and PTSD; menopausal hot flashes, urinary incontinence, and vulvodynia may also respond to SNRIs

PHARMACODYNAMICS block presynaptic serotonin and norepinephrine reuptake pumps, leading to prolonged postsynaptic serotonin and norepinephrine receptor occupancy; SNRIs vary in affinity for each type of pump Llong monoamine oxidase inhibitor

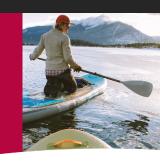
DESIGN THINKING IN RESEARCH AND CLINICAL PRACTICE



Community & Primary Care

Live your life and don't hold back

Pain Management in Pueblo



Living with pain is

not the only option.

Feel better, get out

there, and enjoy the

Southern Colorado.

Flip to explore options and resources >>

uchealth

natural beauty of

ons

nd Relaxation

reduce heart rate and blood e a feeling of calm.

tions

es (Tylenol® or NSAIDs) block pain ght be used for severe chronic pain.

rapy

ovement is accomplished using rcise, stretches, and massage.

ms and Ointments

ucts such as Voltaren®, capsaicin, reams absorb through the skin.

uding regular activity, weight a healthy diet-may improve pain.

Care in Our Community

Pueblo is a small city with big potential. As our neighborhoods continue to grow, our healthcare needs become increasingly complex. Fortunately, there are an ever-expanding number of resources available within minutes—and even more specialists located in Colorado Springs and Aurora. Through the UCHealth App and My Health Connection online, care is always on hand.

Pain is Complex

Although pain can be caused by numerous conditions, there are just as many management options. Your resources in Pueblo offer a large variety of treatments to help you feel better.

Routine pain management visits and procedures are easily accessible at Parkview Medical Center*, just west of Mineral Palace Park. For more specialized care, the UCHealth Pain Management, Physical Medicine and Rehabilitation Clinic in Colorado Springs and Pain Management Clinic at Anschutz Medical Campus are both a short drive away.

In all UCHealth clinics, every effort is made to achieve the best possible outcome in the shortest and most cost-effective treatment plan for you. Rest easier knowing your health and well-being are the highest priority.

*Parkview Medical Center is not affiliated with or part of UCHealth

Learn more at uchealth.org

nics

th Pain Management Clinic edical Center Point, Suite 215 do Springs, CO 80907 5.7130

lth Pain Management - Anschutz E 16th Ave, 1st Floor CO 80045 8 1970

uchealth

DESIGN THINKING IN MED SCHOOL STUDENT LIFE

FROM THE EDITORS

Dear Class of 2023.

Congratulations and welcome to medical school! We are genuir you're here and look forward to meeting you all.

At this time in your life, you are likely facing a great deal of unce don't panic! Whether you're moving down the street or across t hope this guide will be helpful in answering some of your questi is to minimize the stress of your transition into the best years of

Part A of the Medical Student Guide (available digitally) covere should have arranged by the time you arrive on campus.

Part B (what you are reading now) covers things you should kno explore around the Anschutz campus and become an experience addition to digital distribution, you will receive a printed edition

Putting together this guide would not have been possible withou contributions from past editors, interest group leaders, our class the entire Office of Student Life—with special thanks to Hailey all want you, the incoming class, to have the most relevant and information as you begin your journey at the University of Color Medicine.

So, whether you're feeling nervous, or anxious, or maybe even a know that we take care of each other here at CU. You're going to awesome and unforgettable first year experience, so enjoy it an

Onward!



Vincent Fu o vincefox8 | Class of 2022



Saori Lillian Hais o slhaigo | Class

ORIENTATION WEEK

Be sure to read Part A for important information about things to complete before you get to campus and what to expect for orientation week!



CAMPUS & BEYOND

Guide to Navigating Denver

Ten years ago, this section was relevant. In 2019, however, Google Maps is a far more detailed and customized resource than we could ever prepare.



Pearl

Campus Coffee & Eats

ED2N Woodgrain Bagels artisan bakery, breakfast fare, and coffee conveniently located on the east side of the quad

Fitzsimons Cafeteria new vendor coming Fall 2019



Children's Hospital Cafeteria - coffee and cafeteria with numerous options

RC2 Etai's Café - coffee and deli-style soup, salad, and sandwich selections

UCH Strip - features chain shops including Dazbog coffee and Subway



Off-Campus Eats & Happy Hours

Again, Google Maps is better than any list we could put here!

If you're looking for recommendations though, check out Vincent's Top Eats in Denver. This city offers so much to taste and explore!

DIGITAL LITERACY IN MED SCHOOL STUDENT LIFE





DIGITAL MD CURRICULUM

Needs Assessment

Student Survey



Exploring Attitudes "Do you agree...?"

I <u>would like to</u> be able to create digital educational content such as infographics, videos, posters, and animations.

Agree 50%

Neutral 32%

18% Disagree

TOTAL SURVEYED: 131

I know how to create digital educational content such as infographics, videos, posters, and animations.

Agree 20%

Neutral 23%

57% Disagree

TOTAL SURVEYED: 131

I <u>would like to</u> create digital educational content.

Agree: 65

I know how to create digital educational content.

Agree 23%

Neutral 23%

54% Disagree

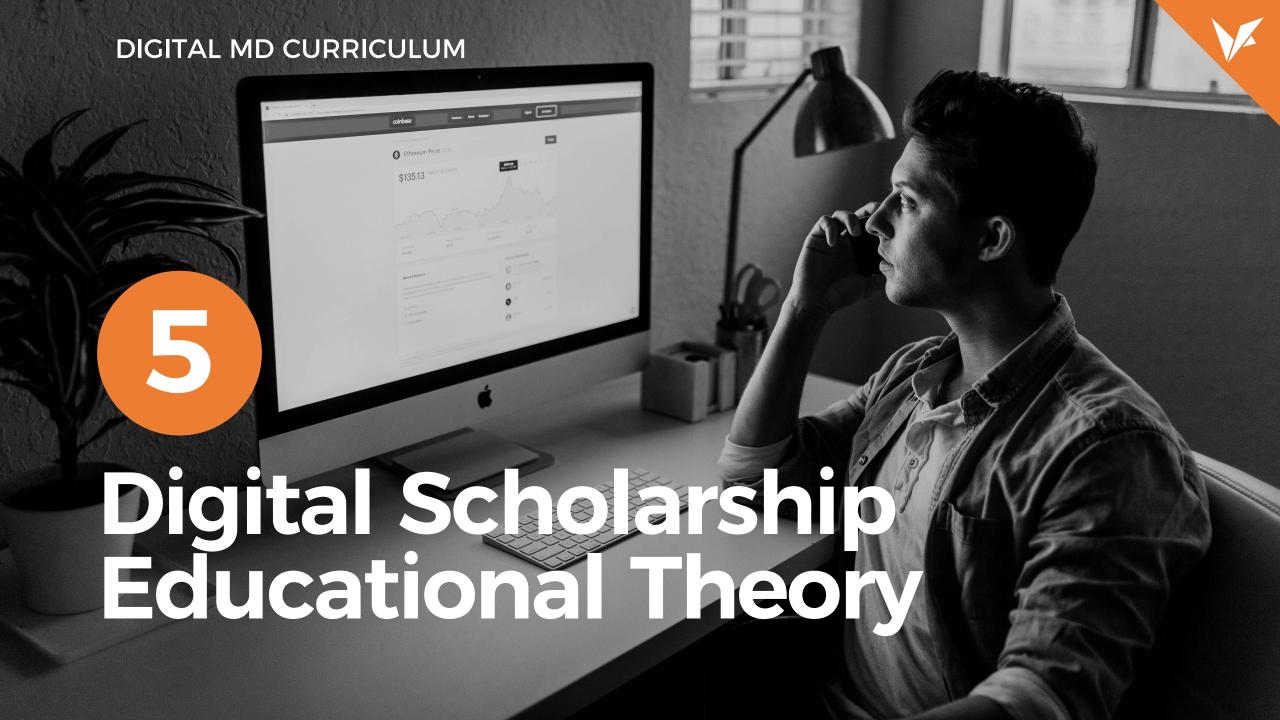
DIGITAL MD CURRICULUM

Overview of Modules

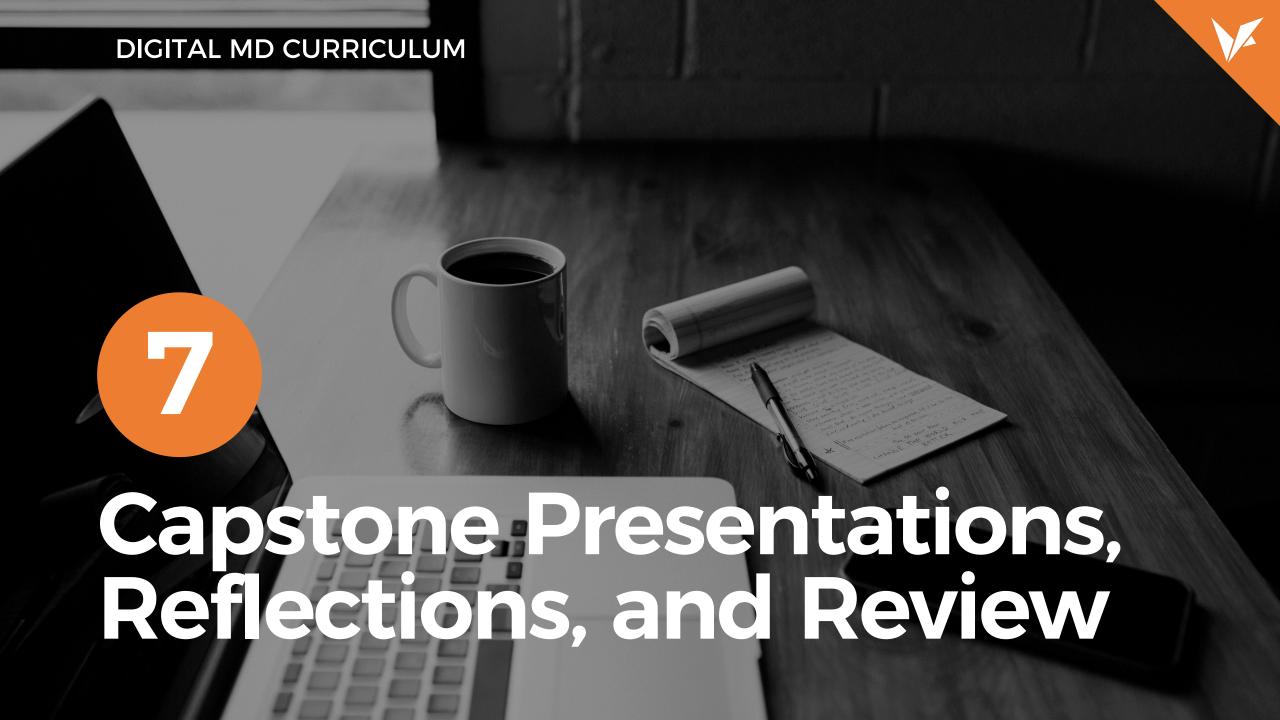




DIGITAL MD CURRICULUM Developing a Professional Identity / Personal Branding







DIGITAL MD: STUDENT CAPSTONES

COVID-19: MYTH VS FACT

MYTH:

"Coronavirus is a brand new type of virus that



We have seen many different types of coronaviruses, just like different types of influeza viruses. This is a family of viruses that can cause respiratory infections, many are fairly mild like a common cold. SARS is another example of a Coronavirus.

MYTH

'Having Coronavirus is just like having a bac

FACT

COVID-19 and the flu both have symptoms of cough and fever. COVID-19 can also cause shortness of breath. Current data shows that COVID-19 is more infectious than the flu. Each person with the Coronavirus infects 2.5 other people on average versus the flu which infects about 1.3. The fatality rate of COVID-19 is estimated to be between 1-3.7%, whereas the seasonal flu is about 0.1%

MYTH:

I don't need to socially distance myself because I'm

FACT

Social distancing is a group effort- everyone has to do their part for it to be effective. Even if you are not afraid of contracting the virus because you are young and healthy, you may end up passing it to someone who is in contact with the elderly, immunocompromised, or someone with heart disease.

MYTH

'I can't pass Coronavirus if I don't



Studies have shown than you can still be contagious with COVID-19 in the early stages of disease, before you start to show symptoms. This is why it is so important to practice social distancing, even if you don't think you are carrying the virus.

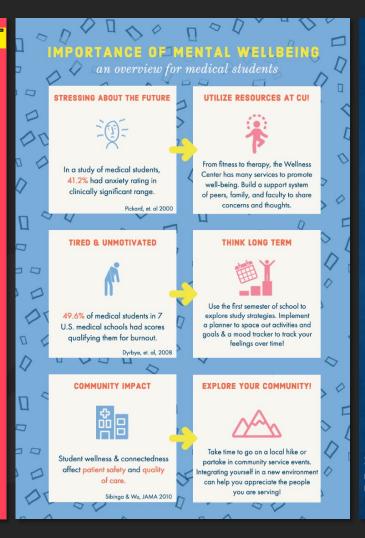
MYTH:

"I should go get tested immediately if I suspect that I have Coronavirus"

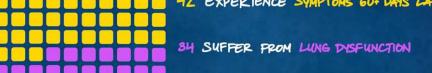
FACT:

You should first call your primary care doctor and they will direct you on the best course of action. In about 80% of cases, symptoms of this virus are mild and can be taken care of at home. There is no medication to treat Corona virus. If you are sick, it is best to stay home and avoid public areas so that you don't spread this virus to other people. If you are experiencing trouble breathing, confusion, chest pain, or blue lips, seek medical care immediately

FOR MORE INFORMATION ON COVID-19: VISIT HTTPS://WWW.CDC.GOV/CORONAVIRUS/2019-NCOV/INDEX.HTML







29 EXHIBIT INFLAHMATORY HEART DAMAGE

12 ARE SIGNIFICANTLY FINANCIALLY BURDENED

2 APE UNABLE TO PETURN TO WORK

SOURCES:

https://pubmed.ncbi.nlm.nih.gov/32838236/ https://pubmed.ncbi.nlm.nih.gov/32644129/ https://www.acpjournals.org/doi/10.7326/M20-5661 https://jamanetwork.com/journals/jamacardiology/fullarticle/2768916



DIGITAL MD: STUDENT CAPSTONES



PRACTICE WHAT YOU PREACH

DIGITAL MD: A Novel Social Media and Digital Scholarship Elective

Vincent Fu, BS | MD Student, University of Colorado School of Medicine Matthew Zuckerman, MD | Assistant Professor of Emergency Medicine, University of Colorado

BACKGROUND

75% of medical students use social media.

1 in 5 medical students create and use online educational resources and connect with peers and mentors through social networks.

Current medical curriculum lacks coursework to support medical students in digital scholarship and educate them about online professionalism.

METHODS

Digital MD is an online curriculum utilizing pre-existing materials, quest speakers, zoom discussions, and tiered assignments.

Students use Adobe Creative Cloud to create a digital media capstone at course completion.

MODULES

- 1 What is Social Media and Digital Scholarship?
- 2 Legal and Ethical Pitfalls of Online Citizenship
- 3 From Lurker to Contributor/Social Media Activism
- 4 Developing a Professional Identity/Personal Branding
- 5 Digital Scholarship Education Theory
- **6** Everyone is Creative: Adobe Creative Cloud (Guided Lab)
- 7 Capstone Presentations, Review, and Feedback

RESULTS

We enrolled 9 students over 3 course sessions.

100% of respondents agreed the course helped:

- Define concepts
- Understand online advocacy
- Make them more likely to use social media and digital scholarship in their education

CONCLUSIONS

Social media is an important and increasingly critical part of physician communication and professionalism.

Resources are available, expanding, and proven to be feasible within MedEd.

Digital MD has meaningful impact on students through the creation of capstone projects and enhanced social media engagement with real-time, real-world influence.

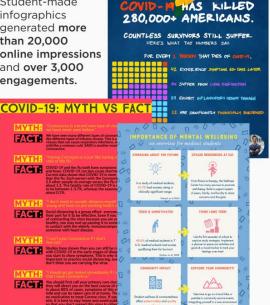
Join the #DigitalMD Conversation





OUTCOMES

Student-made infographics generated more than 20,000 online impressions and over 3,000 engagements.



FACT

FACTI

FACT!

FACTI

FACT:



Join the #DigitalMD Conversation



digitalmd.online

PART THREE

Take Flight





Vincent Fu, MD University of Colorado

MD Emergency Department



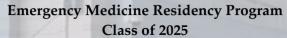
Kelsey Bacidore, MD Chicago Medical School



Riley Liptak, DO University of New England



LOYOLA MEDICINE





Obinna Onyeukwu, MD Wayne State



Crystal Pun, DO
Western University of Health Sciences College



Phillip Williams, MD Chicago Medical School



TAKE FLIGHT

Who Am !?





ADOBE CREATIVE CAMPUS

Final Thoughts



FINAL THOUGHTS

The Secret Sauce





INNOVATIVE INSTITUTIONS

Leading the way





















































THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL























































"We do not change as we grow older, we simply become more clearly ourselves." - Lynn K Hall





Let's Connect

vincent@arctcfx.com



arctcfx