

The Digital Healthcare Professional

Vincent Fu, University of Colorado School of Medicine

@vincefox8 | vincentfu.me



75th TCCTA Annual Conference | 5 March 2022

Vincent Fu

University of Colorado School of Medicine
Founder & Designer, **arctcfx**



THREE CORE PILLARS



DESIGN

arctcfx



FITNESS

#fitfox

MEDICINE

MD



My Adobe Story



PART ONE

Humble Beginnings



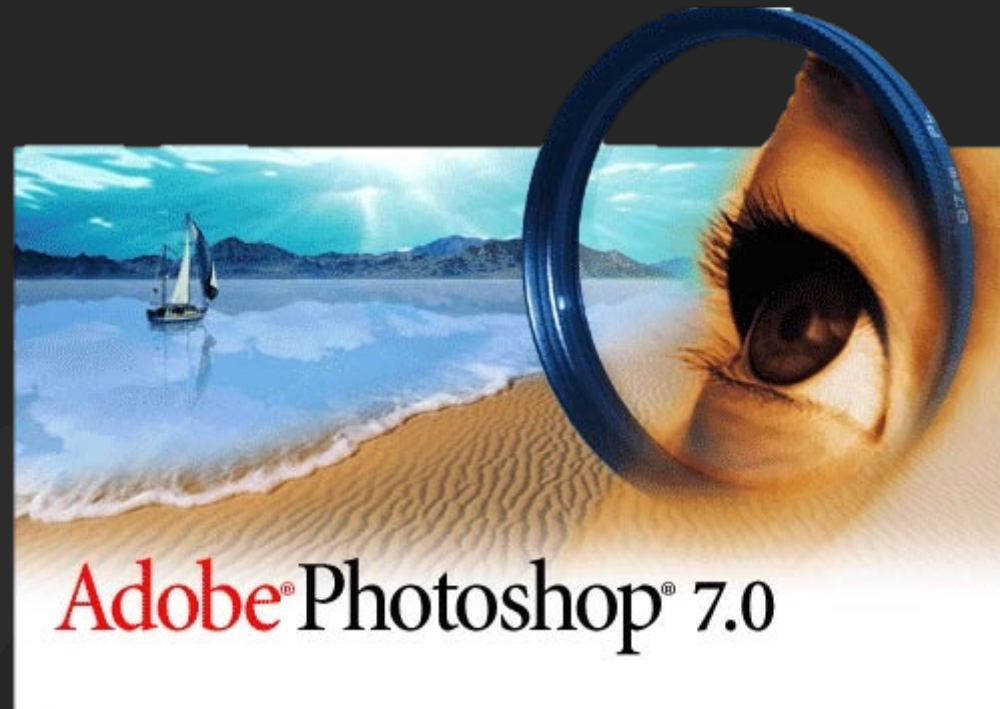
HUMBLE BEGINNINGS

The Early Years

2005-2013



THE EARLY YEARS



THE EARLY YEARS



THE EARLY YEARS



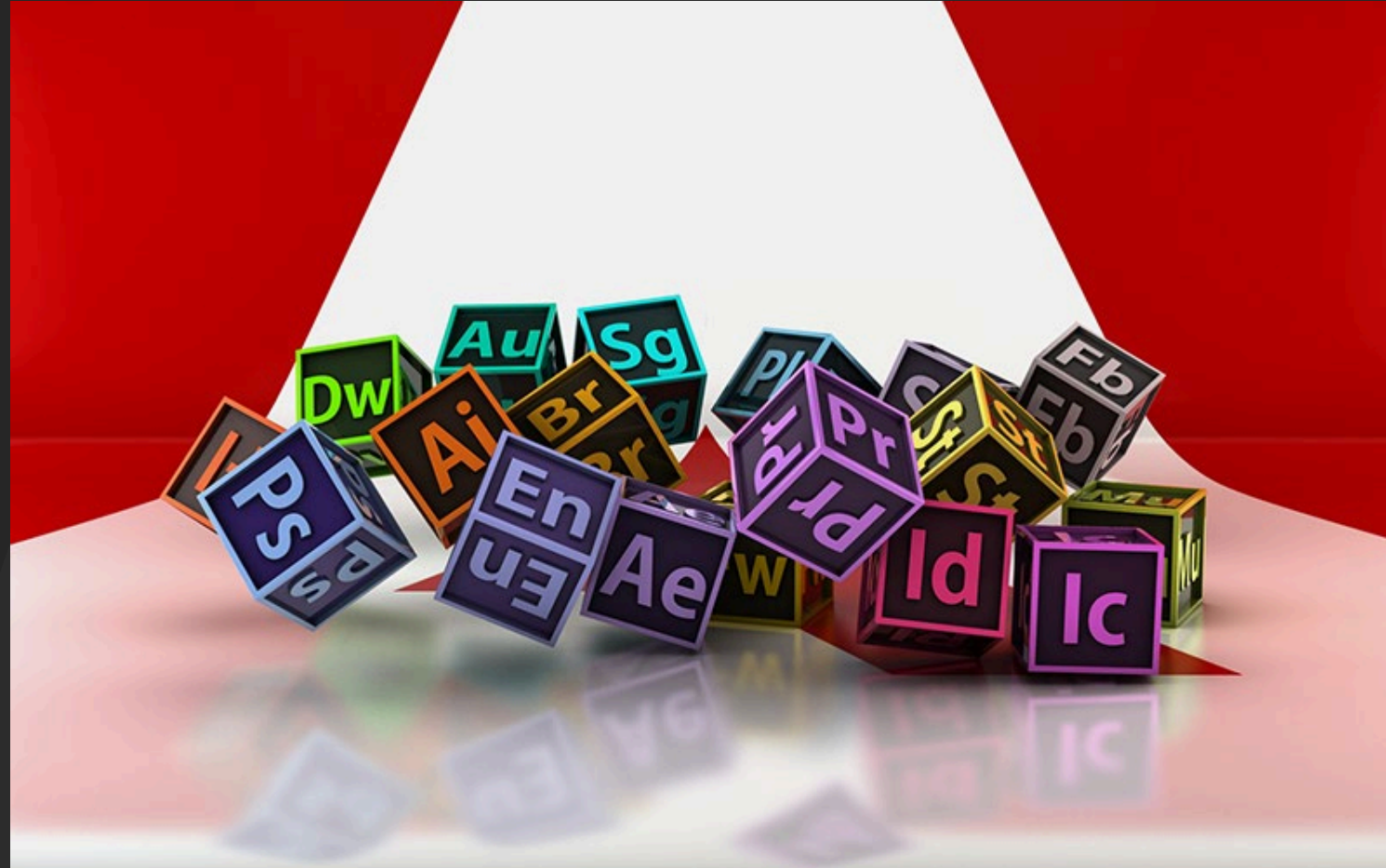
HUMBLE BEGINNINGS

The Undergraduate Years

2013-2017



THE UNDERGRADUATE YEARS





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





University of Utah '17
Biology Honors BS

DIGITAL CREATIVITY



It's a **way of thinking.**



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 insulin-dependent 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.

World Health Organization, 2016



SymbioCellTech has developed a therapeutic that, after a single treatment, has been shown in pre-clinical testing to be a lifelong functional cure for T1DM 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 insulin-dependent 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 T1DM (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

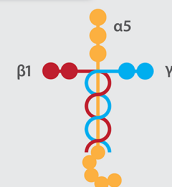
Islet beta cells from two dogs that grew well in previous experiments were selected for the treatment. These islets were cultured in parallel in identical culture flasks, half with human recombinant laminin-511 coatings that were manually applied to the flasks prior to seeding. After allowing all cultures 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.

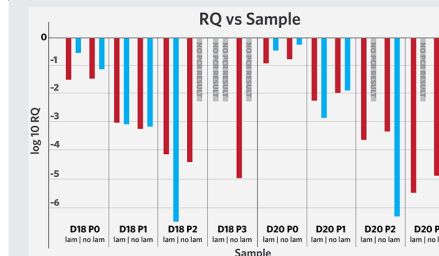
OVERVIEW OF LAMININS

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 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.

RESULTS



Proliferation Rate

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 **glucagon (GCG)** gene expression between cultures.

CONCLUSIONS

r-Laminin-511 does not bear significant effects 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
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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

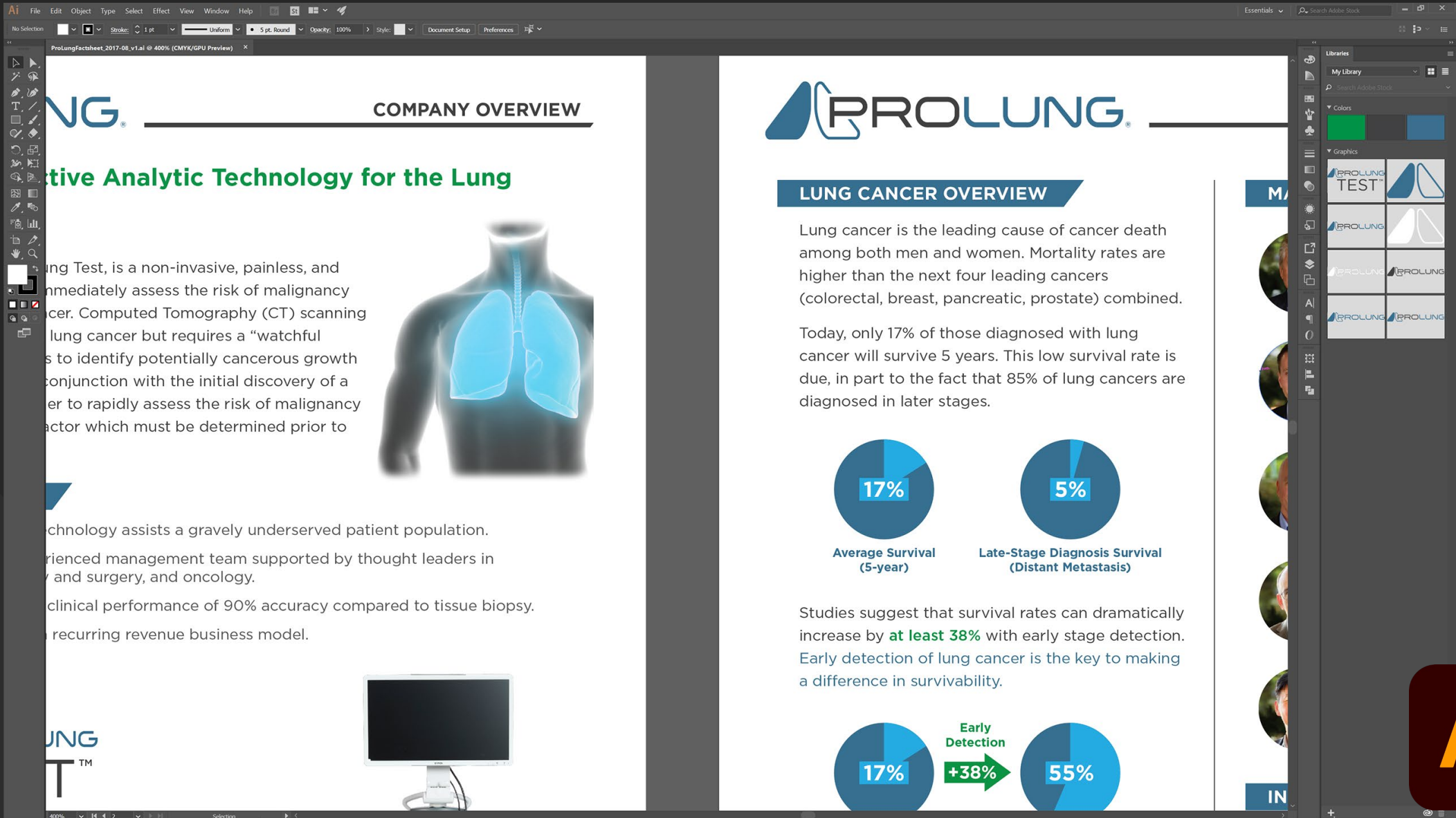
2017-2018





BRÖLUNG

YEAR OF ADULTING



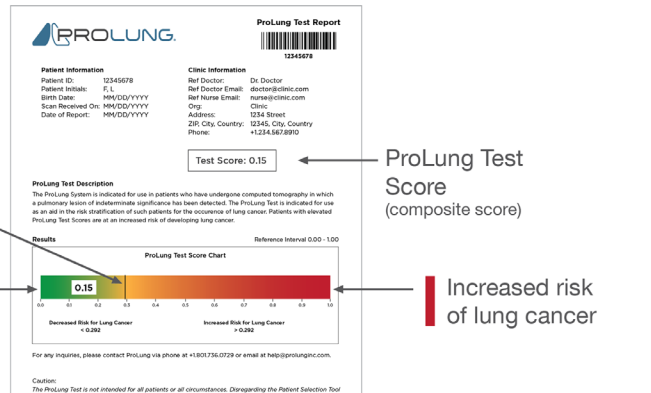
YEAR OF ADULTING



THE PROLUNG TEST REPORT

The value of knowing now.

- Borderline score: repeat test
- Decreased risk of lung cancer



VALUE MEDICINE: STAKEHOLDERS



REIMBURSEMENT

Estimated \$16B in cost savings when deployed as adjunct to LDCT screen*

*Source: CMS codes G0296 and G0297 for annual LDCT lung cancer screening and NCCN Lung Cancer Screening Guideline version 1.2017

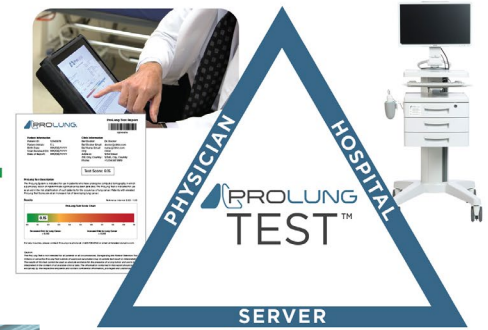


BUSINESS MODEL

PHYSICIAN REPORT

- Digital Test Report
- Quality Check
- Patient Summary

HOSPITAL-PHYSICIAN REVENUE

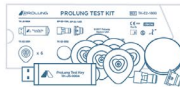


CAPITAL EQUIPMENT

ProLung Test™ Scan System
SALES REVENUE

DISPOSABLES

ProLung Test Kit
RECURRING REVENUE



SERVER
PROLUNG CLINICAL DATABASE
DATA ACQUISITION
Accumulate Data in Clinical Database for Research
ONGOING RESEARCH VALUE
© 2017 ProLung, Inc. All Rights Reserved.



ARCTCFX MEDIA, EST. 2017



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

arctcfx

ARCTIC FOX DESIGN, LLC



PART TWO

How It's Going



HOW IT'S GOING

Medical School

2018-present





The NOPE End

STILL HOOKED ON ADOBE



DESIGN THINKING IN THE MED SCHOOL CLASSROOM



ESSENTIALS OF NEUROLOGY

Ocular Cranial Nerve Palsies

Double vision and ocular misalignment are caused by dysfunction of the extraocular muscles. This often results from an abnormality of the motor nerves to these muscles (cranial nerves III, IV, and VI).

Neuroanatomy Overview

Three cranial nerves supply motor control to the six extraocular muscles which control the eye, the major eyelid elevator, and the pupillary constrictor.

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 ophthalmic nerve (V1) and maxillary nerve (V2). The sinus, enveloped by dura, is situated superior to the sphenoid bone and inferior to the optic chiasm.

Image: Ento Key

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.

Image: Springer

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.



Relations

Share



Ouch.

Share

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 postsynaptic serotonin receptor occupancy

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

SEROTONIN-NOREPINEPHRINE REUPTAKE INHIBITORS (SNRIs)

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

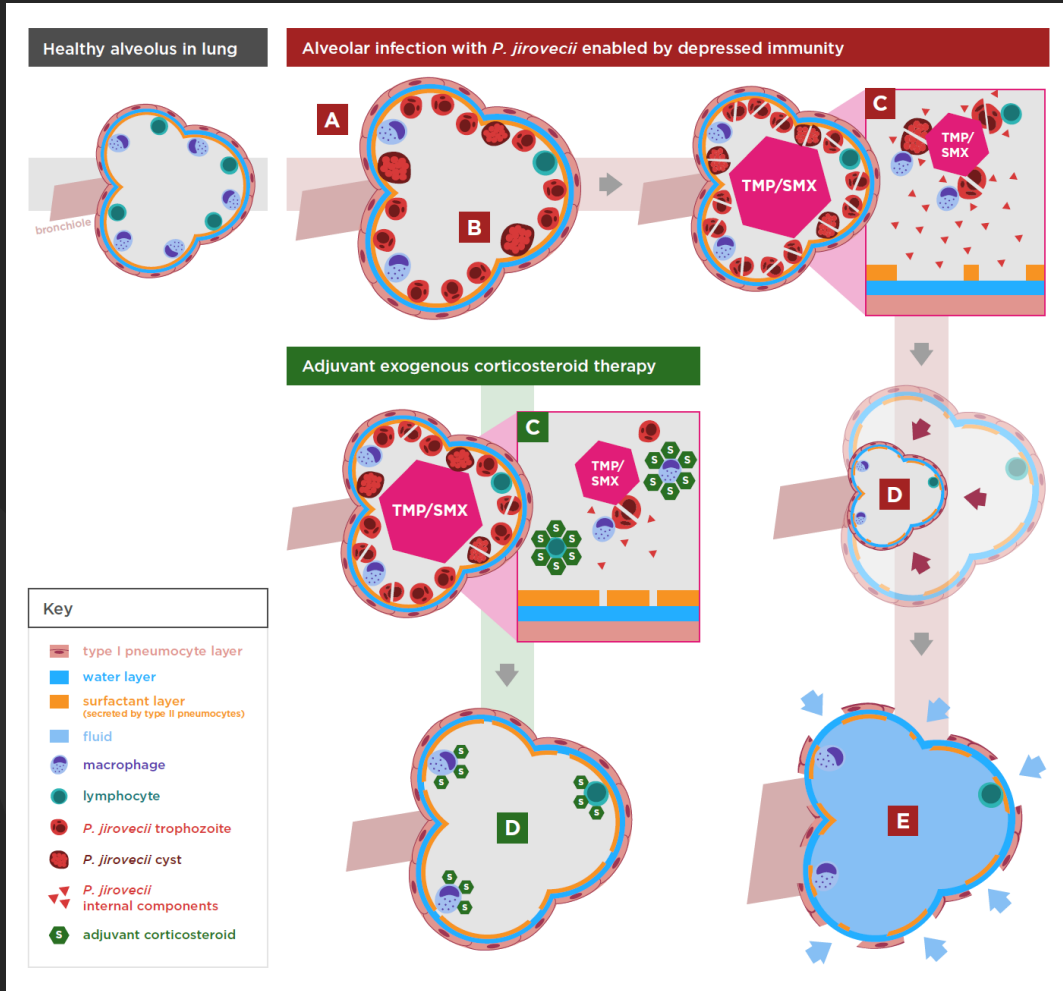
PHARMACODYNAMICS block presynaptic serotonin and norepinephrine reuptake pumps, leading to prolonged postsynaptic serotonin and norepinephrine receptor occupancy; SNRIs vary in affinity for each type of pump



PAGE



DESIGN THINKING IN RESEARCH AND CLINICAL PRACTICE



Community & Primary Care

Live your life and don't hold back

Pain Management in Pueblo



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 UHealth 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 UHealth 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 UHealth 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 UHealth

Learn more at uhealth.org

Options

and Relaxation

is reduce heart rate and blood to a feeling of calm.

tions

as (Tylenol® or NSAIDs) block pain might be used for severe chronic pain.

rapy

ovement is accomplished using exercise, stretches, and massage.

ms and Ointments

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

cluding regular activity, weight a healthy diet—may improve pain.

Living with pain is not the only option. Feel better, get out there, and enjoy the natural beauty of Southern Colorado.

[Flip to explore options and resources >>](#)



Community & Primary Care
Produced by Vincent Fu / Arctck Design





FROM THE EDITORS

Dear Class of 2023,

Congratulations and welcome to medical school! We are genuine about how excited we are to have you here and look forward to meeting you all.

At this time in your life, you are likely facing a great deal of uncertainty. Don't panic! Whether you're moving down the street or across the country, we hope this guide will be helpful in answering some of your questions. Our goal is to minimize the stress of your transition into the best years of your life.

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

Part B (what you are reading now) covers things you should know about life around the Anschutz campus and become an experienced student. In addition to digital distribution, you will receive a printed edition of this guide.

Putting together this guide would not have been possible without the contributions from past editors, interest group leaders, our class members, and the entire Office of Student Life—with special thanks to Hailey K. We want you, the incoming class, to have the most relevant and helpful information as you begin your journey at the University of Colorado School of Medicine.

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

Onward!



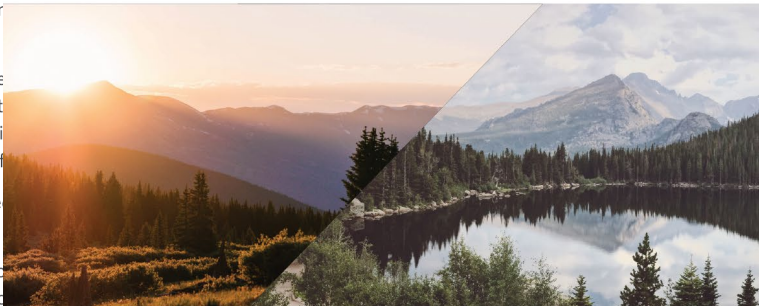
Vincent Fu
@vincefox8 | Class of 2022



Saori Lillian Haigo
@slhaigo | Class of 2022

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

Maps is especially useful for live traffic, since your typical commute route may be affected by construction or an incident. Even after commuting for a year, I find that it's still useful to consult Maps before I head out.

Be safe out there!

Campus Coffee & Eats

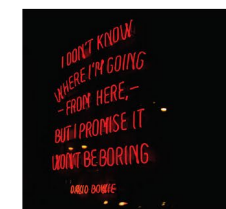
ED2N Woodgrain Bagels - artisan bakery, breakfast fare, and coffee conveniently located on the east side of the quad

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!





Au

Ae

Pr

DESIGN THINKING IN CLINICAL ROTATIONS



The screenshot shows a clinical notes application interface. A central modal window titled "TODO" is open, partially obscuring the main content. The interface is organized into several sections:

- Dispo** (Disposition): Includes options for VS, Exam, PO, and Walk.
- Pt Goals** (Patient Goals): A section for setting goals.
- Plan for f/u** (Plan for follow-up): A section for planning follow-up.
- PCP** (Primary Care Physician): A field for the PCP.
- CC** (Chief Complaint): A large text area for the chief complaint.
- HPI** (History of Present Illness): Includes sub-sections for **Ons** (Onset), **Loc** (Location), **Char** (Characteristics), **Rad** (Radiation), **Exac/Allev** (Exactness/Alleviation), and **Assoc Sx** (Associated symptoms).
- VS** (Vital Signs): Includes BP, T, P, R, O2, and BMI.
- RHx** (Review of History): Includes **Alls** (Allergies), **Meds** (Medications), **PMH** (Past Medical History), **PSH** (Past Surgical History), and **LPO** (Lifestyle/Personal History).
- FHx** (Family History): A section for family history.
- SHx** (Social History): Includes **Sx** (Substance Use) with options for ETOH, smoke, and canna.
- Exam** (Physical Exam): Includes VS and Gen (General) sections.
- Labs** (Laboratory Tests): Includes UA, CSF, UP/b-HCG, Amyl/Lip, ESR/CRP, Lactate, ABG/VBC, Trop, and D-dim.
- Studies** (Imaging Studies): Includes EKG, US, CXR/XR, CT, and MRI.

The "TODO" modal is currently empty and has a "TODO" label at the bottom left.



DESIGN THINKING JUST THIS WEEK



Core Measures
F/E/N:
BReg:
DVT ppx:
GI ppx:
T/L/D:
Tele: Y N
PT/OT: Y N
Code: Full / DNR
Proxy:

Dispo

Barriers

Plan for f/u PCP

Outbnd TODO

note | attg note | consults | orders | sign out | d/c summ | family

PLAN
shock ARF LF RF Arr Lytes Sz w/d

note | attg note | consults | orders | sign out | d/c summ | family

24H naeon code press intub bleed proc
Subj

Exam

Labs

Img

Micro

bleed proc

Exam

Labs

Img

Micro

bleed proc

Exam

Labs

Img

Micro

Vent Ref
NC / mask / NRB flow rate
HHFNC FIO2 / flow rate
BIPAP / CPAP FIO2 / pressure supp setting
IMV mode / TV / RR / FIO2 / PEEP
ABG / VBG + P/F pH / CO2 / O2 + PaO2 / FIO2

EtOH smoke canna

Ai

#socialmedia | #digitalscholarship



DIGITAL MD

new elective this fall @ CUSOM

limited spots — sign up now



DIGITAL MD CURRICULUM

Needs Assessment

Student Survey





Exploring Attitudes

“Do you agree...?”



I would like to 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 would like to 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





1

What is Social Media and Digital Scholarship?



2

Legal and Ethical Pitfalls of Online Citizenship



3

Transitioning from Lurker to Contributor / Social Media Activism



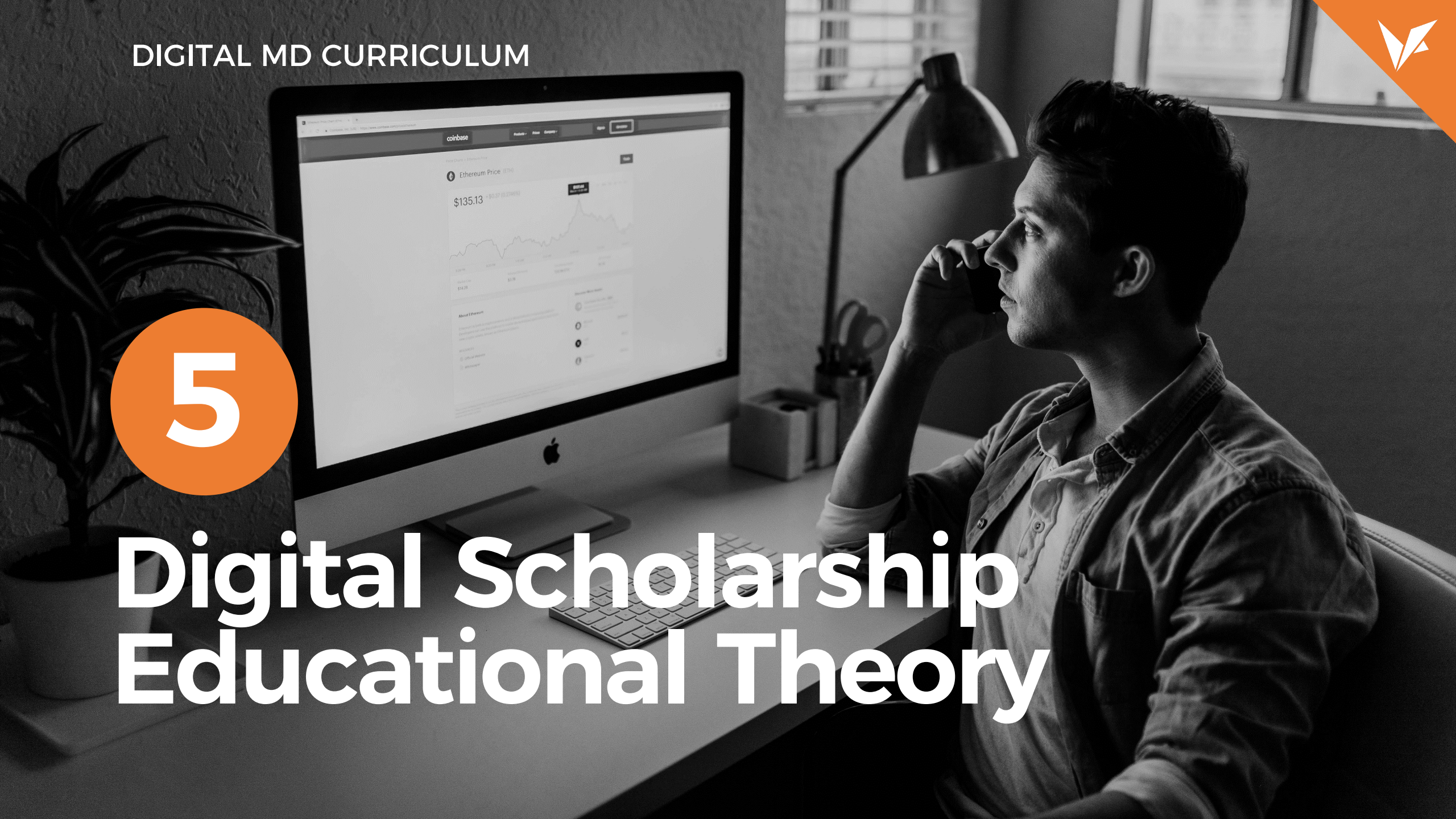
4

Developing a Professional Identity / Personal Branding



5

Digital Scholarship Educational Theory





6

Lab: Everyone is Creative with Adobe



7

Capstone Presentations, Reflections, and Review



COVID-19: MYTH VS FACT

- MYTH:** "Coronavirus is a brand new type of virus that we have never seen before."
FACT: We have seen many different types of coronaviruses, just like different types of influenza 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 bad cold or the flu."
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 young and have no pre-existing health conditions."
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 feel sick."
FACT: Studies have shown that 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](https://www.cdc.gov/coronavirus/2019-ncov/index.html)

IMPORTANCE OF MENTAL WELLBEING *an overview for medical students*



COVID-19 HAS KILLED 280,000+ AMERICANS.

COUNTLESS SURVIVORS STILL SUFFER.
 HERE'S WHAT THE NUMBERS SAY.

FOR EVERY 1 PERSON THAT DIES OF COVID-19,



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>

Vijay Shimoga
 @vijay_shimoga



DIGITAL MD: STUDENT CAPSTONES



Pinned Tweet

Vijay Shimoga @vijay_shimoga · Dec 15, 2020

Thanks for the RT, @meganranney! I believe it's critical for the conversations around COVID to better capture adverse outcomes besides mortality that many in the media are neglecting to discuss.

Megan Ranney MD MPH @meganranney · Dec 15, 2020

Myth: it's more dangerous than covid

Fact: 1% of all ppl who catch #covid19 die. Another 10-20% are hospitalized. Another 30+% have long lasting symptoms. The vaccine is far safer, with only minor temporary side effects.

[Show this thread](#)

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

Vijay Shimoga

6:40 AM · Dec 15, 2020 · Twitter for Android

386 Retweet

386 Retweets **31 Quote Tweets** **1,759 Likes**

Tweet your reply Reply

Digital
literacy is a
way of
thinking.



Join the #DigitalMD Conversation



@vincefox8



@matthew608b

digitalmd.online

PART THREE

Sky's The Limit





DIGITAL MD

IDPT 6674 | #socialmedia #digitalscholarship





F E E L T H E N E E D



Ps

Ai

Au

SKY'S THE LIMIT

Who Am I?



VINCENT FU, (ALMOST) MD



DESIGN

arctcfx



FITNESS

#fitfox

MEDICINE

MD

TCCTA 2022

Final Thoughts

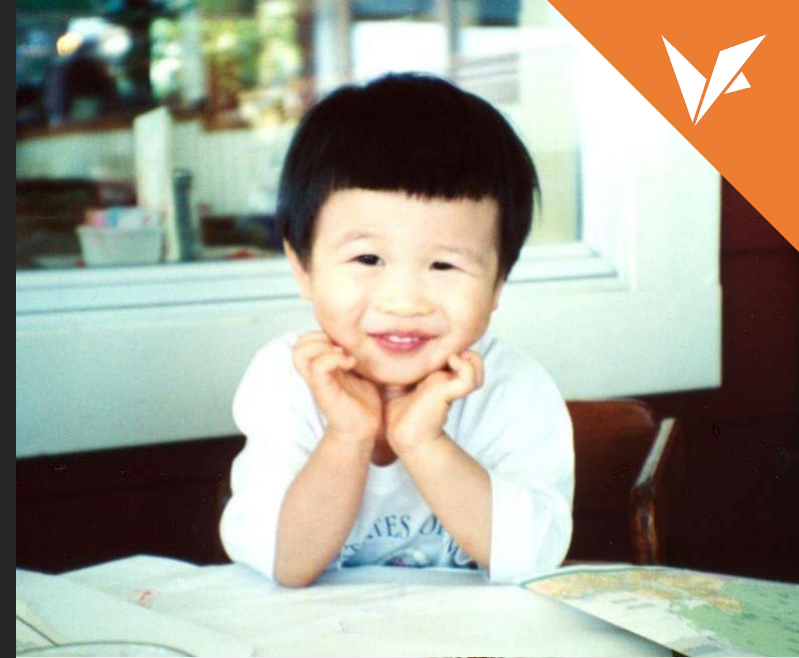


FINAL THOUGHTS

Creativity in Healthcare



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





Let's Connect

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[arctcfx](#)