Emmanuel Cruz

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- **Summary** I am on a lifelong journey to tailor healthcare to the patient by charging teams with innovation, designing new technology, and improving processes in orthopaedics.
 - Skills & Team dynamics, platform design, project management, grant reviewal, drug discoveryAbilities (IND stage), data science, python, machine learning, deep learning, cloud computing, medicinal chemistry, pharmacology, molecular dynamics, and entrepreneurship.

Education Medical Doctorate 2022 – 2026

- CU Anschutz Medical School, Actively Enrolled
- Dean's Distinguished Scholarship Award (Full Tuition)

MEng in Computer Science 2018 – 2019

Cornell University, NYC Campus

- Peggy J. Koenig Cornell Tech Fellowship Award
- Collaborated on ideation and prototyping with several HealthTech startups across NYC (AwareHealth, NeuralPositive, and more)

B.S in Chemistry 2014 – 2018

University of South Florida, Tampa Campus

- T.C Owen Undergraduate Researcher of the Year Award
- ^{3rd} Place Winner of the USF Chemistry CASTLE Research Conference
- First Ever Recipient of Courageous Bull Award

Leadership CU Innovations President Fall 2022 – Current

An alumni-funded grant endowment that funds community-centered, high impact, medical student led ideas up to \$2,000 per year.

- Manage, grow, and lead an alumni endowment of \$200,000+ devoted to student communitycentered innovations
- Strategized a template that increased application submission by 422% over the course of two years
- **Recruit, allocate, and spin off** student led initiatives such as a new media lead and community engagement lead
- Advertise and coach fellow health profession students to submit proposals for their idea, form achievable budgets, and contract appropriate mentorship
- **Organize and host** a yearly banquet celebrating new scholars and allowing former scholars to present their work with alumni and key stakeholders.

Scholarly Service Branch President May 2024 –2025

Scholarly service branch includes three subsections- Research, Community Service, and Scholarly Service Grant (aka, "Innovations"). This branch serves as the campus hub for all students interested in the mentioned categories.

- **Delegate and account** for all student roles, initiatives, and issues to grow each other as leaders and improve our campus' presence.
- Co-led and advertised the "Safe Halloween" and other community service events by connecting the community service team with more resources and key administrators
- Lead biweekly meetings where members state goals, their issues, and where help is needed to maintain direction and milestone goals

Medical Student Council (MSC) Vice President May 2024 –2025

Medical student council runs all aspects of student life, ranging from all medical student organizations to all medical student campus events.

- **Co-lead** all biweekly medical student council meetings and their responsibilities.
- Initiate and see through a variety of improvement projects, such as a quality improvement website
 update, restructuring the entire student research wing, increasing quantity and quality of community
 service events, and improvements in MSC attendee diversity
- Bridge communication to School of Medicine Deans and key administration to achieve MSC goals, ensure smoothness of events, or gather advice
- Ensure handoffs of all student leadership positions within MSC across both MD and MD-PHD programs

Medical Class of 2026 Vice President May 2023 –2024

As part of each class there is a board to help communicate with its members consisting of two presidents, a vice president, a secretary, and treasurer.

- Assist and direct issues, concerns, or feedback from school of medicine Deans.
- Help create weekly newsletters, increase student engagement, and improve class morale

Catholic Medical Student Organization President June 2023 – Current

A small on-campus organization which aims to connect, support, and educate medical students who hold, or are curious about, Catholic medical belief.

- **Design, create, and host** semesterly events that connect and grow the community
- Assist with planning and attend yearly free health clinic events hosted at local churches that serve a largely uninsured and underinsured population

CU School of Medicine Weightlifting Club, Active Member September 2023 – Current A small on-campus organization which aims to educate and improve the mental health of its students and community through safe, evidence-based weighted exercises.

- Host and attend semesterly "Pumping Iron with the Deans" (PIWTD) events that allow school Deans to socialize and lead workouts of 10-15 students in a team-building environment
- Manage and plan the yearly PIWTD event, with a goal of 5 Deans and 30 students in a friendly tournament-based style to enrich the campus' supportive and approachable culture
- Patents WO2021097352A1, Isoxazole derivatives targeting tacc3 as anticancer agents. Inventors: Erden BANOGLU, Burcu CALISKAN, Ozgur Sahin, Deniz LENGERLI, Özge Akbulut, Chaemin Lim, Emmanuel CRUZ, Sridhar VEMPATI, Kubra IBIS. 2020.

US63173796, COMPOSITIONS AND METHODS FOR TREATING CANCER. Erden BANOGLU, Burcu CALISKAN, Ozgur Sahin, Deniz LENGERLI, Özge Akbulut, Chaemin Lim, Emmanuel CRUZ, Sridhar VEMPATI, Kubra IBIS. 2021.

Publications (Pending) Case Study: CHANTER Syndrome in adolescent male – identification, management, and rehabilitation. *Emmanuel Cruz, MD Student; Oliver Bawmann MD; Erin Mundy MD; Matthew Alfano MD; Alia Broman MD.* 2025.

(**Pending**) Perioperative Angiotensin Receptor Blocker (ARB) Use Shows Decreased Rates of Manipulation Under Anesthesia (MUA) and Revisions After Total Knee Arthroplasty (TKA): A

Systematic Review. Melissa L. Carpenter, BS¹; Emmanuel Cruz, MEng¹; Ankit Hirpara, BA¹; Jason Sidrak, BS¹; Michael Dayton, MD¹; Craig Hogan, MD. **2024**.

(**Pending**) Clinical Management of Pediatric Patients with Multiple Hereditary Exostoses – An Institutional Experience. *John Schutz, MD; Emmanuel Cruz, MEng; Nicholas Felan, BS; Carson Keeter MS; Shelley Dell'Orfano, DND; Nathan Donaldson, DO.* **2025.**

(Pending) Examination of Patient Reported Outcomes in Pediatric and Adolescent Sarcoma Patients in a large database of surgical outcomes and quality of life. *Emmanuel Cruz, MEng; Nicole McCaw BS; John Schutz, MD; Mia Lundin, BS; Steven Thorpe, MD.* 2025.

Letters to a Clerkship Student: An Annual Publication for the School of Medicine. Emmanuel Cruz. Editor, Anjali Dhurandhar, MD. Arts and Humanities in Healthcare Program: University of Colorado Anschutz Medical Campus. August **2025**

AACR 2023, 1664 / 21 - Discovery of a novel and potent TACC3 protein-protein interaction inhibitor targeting highly aggressive cancers. Ozgur Sahin¹, Erden Banoglu¹, Chaemin Lim², Burcu Caliskan¹, Emmanuel Cruz², Sotirios Stergiopoulos², Sridhar Vempati². **2023**.

Front. Artif. Intell., Artificial Intelligence for COVID-19 Drug Discovery and Vaccine Development. Arshadi, KA; Webb, J; Salem, M; Cruz, E; Yuan, JS*. 2020.

Organic Letters, Enantioselective Total Synthesis of Cannabinoids- A Practical Route for Analog Development. Shultz, Z; Cruz, E; Leahy, J*. **2018**. ID: ol-2017-03668r

Presentations SGIM 2024, Taking Charge of Discharge: A Patient-Centered Approach

Michelle Yan, BKin, MD Student; Kimia Ziafat, BSc, MSc, MD Student; Yassine Lamzadrhi, MD Student; Emmanuel Cruz, BS, MEng, MD Student; Tyler Anstett, DO; Samuel Porter, MD; Michelle Knees, DO

Drug Discovery Biology and Bioinformatics 2023, VIP Speaker

Emmanuel Cruz, BS, MEng, MD Student Represented A2A Pharmaceuticals alongside other technology innovators from Jazz Pharmaceuticals, Recursion Therapeutics, and many others to discuss innovation in small molecule bioinformatics.

(Pending) AAP 2025, Case Study: CHANTER Syndrome in adolescent male – identification, management, and rehabilitation

Emmanuel Cruz, MD Student; Oliver Bawmann MD; Erin Mundy MD; Matthew Alfano MD; Alia Broman MD

Research Utilizing Web App Development for Medical Education – A Series of Projects (2) Experience University of Colorado Hospital - Anschutz 1) ABCKidney (https://app.abckidney.com/) • Oversee, project manage, and co-execute all items from minimum viable product to a second iteration, high function medical education platform with accounts, multi-server data handling, administrative panel, and student access portals alongside Dr. Sophia Ambruso, DO. • Assisted with the validation and spending of a \$75,000 grant to develop unique 'interactive

- Assisted with the validation and spending of a \$75,000 grant to develop unique interactive modules' that help teach renal physiologic basics such as RAAS pathway, sodium-water imbalance, and nephron microanatomy through gamification.
- Helped achieve a 30% discount on a third party development contractor, LightIT (lightit.io), totaling \$45,000
- Continue to assist with the medical education research, student life integration, and continued development of the platform through the IRB-approved study to take place January 2025

2) Orthopaedic Surgery Through Interactive Gamified Modules

Create a team of orthopaedic-interested students, faculty, and software engineers

- Ideate and design two orthopaedic 'bone games' that teach nuances of molecular signaling that impacts bone health and disease progression (ie, osteoarthritis and osteoporosis)
- Lead team through milestones, objectives, and obstacles to develop this mini-platform to a minimum viable product (MVP) on a shoe-string, student-funded budget

(Pending) Case Study: CHANTER Syndrome in adolescent male – identification, management, and rehabilitation [1st Author]

Denver Health Hospital Authority; Children's Hospital of Colorado Identified a personally impactful patient, gathered a multidisciplinary team of ICU, NSGY, PMNR, radiology, and pediatric specialists to include their critical perspectives

- Applied to the IRB as secondary research, achieved approval from two separate institutions
- Wrote the case study with guidance and feedback from author mentors.

(Pending) Quality of Life Outcomes in Pediatric Osteosarcoma Patients, A Retrospective Review of Child Bone Malignancy database [1st Author]

Children's Hospital of Colorado

 Working on series of publications in the space of child bone malignancies, the first examining quality of life outcomes, long term mobility scores, and identify variables which minimize chronic disease burden (i.e pharmacologic, surgical, and radiation).

HISP Health Innovations Scholar Program, University Hospital - 2023

University of Colorado Hospital - Anschutz (Division of Hospital Medicine & QI)

- Interviewed thirty+ hospital staff and patients to improve patient experience scores through discharge (HCAHPS driven)
- Implemented four solutions across one hospital medicine unit, one which was actively adopted by the discharge nurse team.
- Completed trainings within Quality Improvement including run charts, GANTT charts, SPC charts, data pipelining, and how to use these to enact change in hospital systems.

Developmental Disabilities (DD) and Childhood Trauma (CT), A New Paradigm for Mental Healthcare Workers – 2022-2023

TASK Clinic, CU Anschutz Psychiatry

- Researching the intersection of DD and CT to inform mental healthcare clinics how to handle this
 population of children.
- Collect information from key communities and sources (NCTSN, Traumatic Stress Institute, National Childhood Abuse datasets)

Opioid Crisis Therapy "Anchor" – 2019

Cornell Tech (Startup Studio)

- Led a team to research and design new solutions to prevent prescription opioid abuse.
- Prototyped a new prescription bottle with dispense tracking using Arduino Boards and programmable bluetooth chips. Data was automatically uploaded to a web app developed by the team.
- Organized meetings with leaders in addiction treatment to find business partnerships, included organizations like Addiction Centers America, Addiction Campus, AdhereTech, and WEConnect.
- Demo: https://www.youtube.com/watch?v=kwXtaPu5GcU

Overcoming Dataset Bias using Deep Manifold SMOTE – 2019

Cornell Tech (Dr. C Kanan)

- Implemented Synthetic Minority Oversampling Technique (SMOTE) on iNaturalist and ImageNet ResNet50 Embeddings to boost CNN classification, achieved state-of-the-art performance on datasets.
- Researched other top techniques like Manifolding (Verma et al.) and Hinge Loss (Gentile et al.) and ultimately reimplemented SMOTE with Few-Shot Learning Prototypical Networks (Werthenimer et al.) to customize and improve performance.

Drug Discovery - May 2016 - May 2018

USF Research Park (Dr. JW Leahy)

- Led the Novel Synthesis of THC∆9 Analogues to Treat Alzheimer's Disease
- Presented in 4 Research Conferences, 2 by Invitation
- Regularly Executed Highly Sensitive Rubidium and Chromium Catalyst Reactions
- Adept in Interpreting Complex "unclean" Spectra Through LCMS and NMR

Neuroscience - July 2017 - December 2017

Byrd Alzheimer's Institute (Dr. D Gulick)

- Pioneered a study testing novel analogues of THC∆9 on B-Amyloid plaques
- Skilled in achieving consistent results through Western Blotting on Brain Tissue
- Certified In Mouse/Rat injection, euthanasia, tissue removal in Florida
- Performed an array of statistical tests to confirm significance of Western blots

Physics – July 2017 – December 2017

USF NMR Facility (Dr. E Rivera)

- Repaired corrupt shim maps needed to operate the Nuclear Magnetic Resonance instrument.
- Understood NMR Manual Operation and pulse sequence mathematics for calibration
- Maintained highly valuable instrumentation and optimized performance.

Volunteering Peer Mentor, Boston Underrepresented Groups -- Virtual (2020 - current)

- Developed a close and impactful relationship with an underrepresented highschool graduate
- Guide and mentor student through college courses, timing of life decisions, and navigation of life challenges
- Inspired a student to develop and market a clothing brand they designed
- Meet weekly for many years

Christ the King, Peer Catechist – Denver, CO (2022 - 2024)

- Following a curriculum, teach children of grades 4 through 10 the basics of Catholic faith and oversee them through communion and confirmation.
- Work closely students with a variety of learning challenges
- Manage classrooms of 4 to 8 of young children with one other co-teacher

Denver Rescue Mission, Kitchen Volunteer – Denver, CO (2023 - 2024)

- Help prepare meals for hundreds of daily attendees by prepping, cutting, gathering, moving, or serving.
- Assist with kitchen cleaning at end of each shift, ensuring dishes are washed, dry, and stowed, floors are swept, mopped, and safe for the next meal time.

Aurora Health Alliance Volunteer – Aurora, CO (2023 - 2024)

- Actively engage with stakeholders of Colorado health systems to improve access to specialty care for under and un-insured patients
- Connect groups in the Denver Metro area for productive conversations on the future of Medicaid and Medicare specialty care access (SCA), especially through the adoption of E-Consults.
- Attend quarterly webinars of successful health systems in SCA to inform health teams at conforming hospital systems.
- Inform AHA team members of hospital dynamics and administrative challenges to our missions within the organization.

COAHEC Peer Mentor - Aurora, CO (2023 - Current - 2 weeks per year)

- Mentor and coach low-income, soon-first-generation college, and or rural high school students interested in health professions (nursing, technician, physician, etc)

- Peer led classes around cardiac anatomy engaging students with questions to confirm learning and overcome self-doubt.
- Lectured high school students through brain anatomy with real brain cross sections, emphasizing the privilege and humanity critical to this study.

Burritos & Amigos Alumni Event – Aurora, CO (2023)

- Organized, recruited, advertised, and achieved a school-funded alumni-student event around local family owned mexican cuisine.
- Received over 50+ RSVPs, accounting for dietary restrictions and navigation to the event site.

National Western Stock Show Clinic Volunteer - Denver, CO (2023 - 2024)

- Operate clinical screening devices (blood pressure, glucose test, BMI index, gait analysis, home health and nutrition surveys) for attendees to the National Western Stock Show each year.
- Adapt common clinical questions to a population often adverse to health screens (antivaccination, against health testing, high levels of nerves around healthcare) to ensure patients' health.
- Translate and calm Spanish speaking patients at the Stock Show and connecting them with resources of higher care regardless of citizenship status.

Moffitt Cancer Center Volunteer, Tampa – USF Campus (2015-2018)

Gynecologic Pathology

- Classified varieties of cancer tissue biopsies
- Introduced to cytology and pathology
- Participated in patient autopsy
- Monitored live surgery with pathology confirmations *Radiation Unit & Chemotherapy Unit*
- Learned the Ecosystem of Cancer Treatment
- Answered Common Treatment Questions for Anxious Patients & Families
- Communicated Patient Health Concerns to Staff
- Provided Patients Company, Nourishment and Comfort Items

Lotus Learning LLC – Paid Tutor, Cambridge MA (2020 – 2022)

- Collaborate with 1st generation and low-income college students to solve issues with studies, lifestyle, personal life, and mental health
- Create and maintain accountable custom schedules for student success, catering to areas of struggle such organic chemistry or stepwise processes to break down dense assignment text.

Peer Mentor Let's Code - K12 Org., NYC (2019 - 2020)

- Hundreds of middle school students would come to learn foundations of computer science
- Coached a team of 4-5 young students to build Arduino circuits, Minecraft worlds, and prototype ideas
- Helped students understand the 'startup' mentality of innovation and learning

STEM Peer Mentor – USF Campus (2017-2018)

- Advised a group of freshman college students over a 4-week summer course on STEM success
- Led lab sessions, demonstrated the scientific method, and networked students into research
- Continued ties with the group assigned and mentored them in later years

Mural Design – Cornell Tech Campus (2020)

- Designed Mechanics of Pendulum-Art Device for Community Mural Involvement for the Roosevelt Island 2018 Art Festival.

Career Head of Technology June 2019 – June 2022

A2A Pharmaceuticals, NYC

Experience

A biotechnology startup, expert in small molecule oncology drug discovery using our de-novo SCULPT platform.

- Develop and maintain end-to-end SCULPT technology platform, combining computational chemistry and machine learning techniques for ADMET pre-optimized molecules. The SCULPT platform has generated nano-molar hits within our oncology portfolio: KRAS, CLK, FLT3, TYK2, TACC3, and confidential programs.
- Design protocols with CROs and review preclinical assay data to identify small molecule inhibitors in covalent, noncovalent, and PROTAC degradation approaches.
- Perform scientific due diligence on emerging targets in oncology, covering patent, patient, publication, and pathway analyses, including YAP-TEAD, PD1/PDL1, WDR5, ENPP1, and CD47.
- Negotiate, maintain, and explore business partnerships with external research organizations, saving 8% of A2A's annual budget. Designing pitch decks, presenting to investors, garnering meetings, and updating company website.
- Manage the A2A internship program: hire, train, and lead graduate students (MBA, PharmD, PhD, etc.) to develop competitive intelligence databases and in-silico cellular stress response modeling from SMILES.
- Oversee and maintain cloud security systems of A2A's cloud portal which houses our platform, license servers to access computational software packages, remote SSL secure jupyter-notebooks, AWS Workspaces, AWS Sagemaker, AWS S3 buckets, with secure IP access points.

Hobbies &
InterestsWeightlifting, film and digital landscape photography, motorcycling, dog training, banjo
bluegrass, whitewater kayaking, running, backcountry camping, salsa, bachata, poetry, surfing

References Dr. Mark Hammerberg, MD

Orthopaedic Medical Doctor, Joint Replacement Assistant Professor, University of Colorado Anschutz Medical Campus e.mark.hammerberg@dhha.org

Dr. Sophia Ambruso, DO

Nephrologist, Department of Medicine & Founder of ABCKidney Associate Professor, University of Colorado Anschutz Medical Campus sophia.ambruso@cuanschutz.edu

Dr. Matthew Rustici, MD

Pediatric Emergency Physician & Physician Lead of the CU Innovations Award Associate Professor, University of Colorado Anschutz Medical Campus matthew.rustici@cuanschutz.edu

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