



CNUMPS Program Review

June 2021

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I. Introduction/Context.

The California Northstate University, Master of Pharmaceutical Sciences (CNUMPS) program is a 2-year master's program based in Elk Grove, CA, which is dedicated to the development of



highly competent, critical-thinking, research-centered graduates. The CNUMPS is a natural extension of the University's mission to *advance the art and science of healthcare*. The CNUMPS is strategically aligned with CNU's Vision to provide innovative education and healthcare delivery systems for the Northern California region and beyond. The CNUMPS program provides an opportunity for CNU to expand its range of scholarly activities and continue its development of an innovative, integrated curriculum. The Program further serves as an additional venue for CNU to prepare a new workforce for a modern, fast-evolving healthcare sector, specifically in the areas of pharmaceutical discovery and development. It also helps the university build and sustain research opportunities and environment. With innovative training and impactful research, the CNUMPS advances our core mission through expanded *Service, Scholarship and Social Accountability*.

California Northstate University's (CNU) program review process is aligned with the following WASC Senior Colleges and Universities Commission (WSCUC) Criteria for Review (CFRs) from the 2013 Handbook of Accreditation (Standards 2 and 4): CFR 2.7, CFR 4.1, CFR 4.3, CFR 4.4, and CFR 4.6. These requirements address the overall process and place it within the larger context of CNU's ongoing, comprehensive quality assurance and improvement systems. We have especially focused on describing our data-driven analyses and decision-making based on the assessment of our student learning outcomes, and evidence of institutional quality. Further, we underline the importance of the governance process in the CNUMPS - specifically, that the program review process is faculty-driven, that assessment of faculty is carried out by faculty, that



collaboration between the CNUMPS and external stakeholders is vital, and that recognition of the strengths and weaknesses within the program is an indispensable outgrowth of our own self-study.

The CNU Program Review Handbook has been used as a guide to structure this report (Appendix 1). As outlined in the handbook, the distinguishing features of program review of any CNU college are: evidence-based claims and decision-making, assessment of student learning outcomes, and integration of results with planning, budgeting, and institutional quality assurance systems. Therefore, this report outlines our evaluation of the quality of the CNUMPS education program utilizing descriptive and quantitative measures.

In the following sections we provide:

- An introduction of CNUMPS - As a young master's degree program, a historical review highlights why our mission is so vital to the area and region we call home. We also provide a general overview of CNUMPS's administration, continuous quality improvement processes, and learning and research infrastructure.
- Evidence of CNUMPS's program quality - This includes data and supporting materials that provide insights into our student body, the curriculum and learning environment, student learning and success, and faculty.
- Demonstration of overall viability and sustainability of the CNUMPS program - This includes an overview of the demand for the program, graduate outcomes, and allocation



of CNUMPS resources for faculty, student support services, information and technology, facilities, staff, and financial resources.

This program review encompasses the 2-year MPS program at California Northstate University and covers relevant processes and data from the program's inception in Fall 2018 up to and including Spring 2021 (where applicable).

The Office of CNUMPS Dean has overseen the process of self-study within this program review to ensure the mission of CNUMPS guides all areas of growth and continuous quality improvement. This program review report includes relevant data collected from the Assessment Committee, the Curriculum Committee, the Research Committee, the Office of CNUMPS Director, the Center for Teaching & Learning and input from various faculty and staff, either individually or through Committees as well as the university Office of Academic Affairs.

A Program Review Committee was appointed by the Dean of CNUMPS to undertake this full self-study program review and report. The committee is comprised of the following individuals:

Table 1. *CNUMPS Program Review Committee.*

Committee member	Role	Title
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Dr. Catherine Yang (Lead)	Faculty	Vice-President of Academic Affairs; CNUMPS Dean; Professor of Molecular Pharmacology and Clinical Biochemistry
Dr. Ahmed El-Shamy	Faculty	Director of CNUMPS; Assistant Professor of Virology
Dr. Simeon Kotchoni	Faculty	Chair of Research Committee; Associate Professor of Physiology and Biochemistry
Dr. Hongbin Wang	Faculty	Chair of Assessment Committee; Assistant Professor of Pharmacology
Dr. Abdelbasset Farahat	Faculty	Chair of Curriculum Committee; Assistant Professor of Medicinal Chemistry
Dr. Eslam Mohamed	Faculty	Assistant Professor of Medical Immunology
Ms. Bla Chang	Staff	Administration Assistant

The overall governance process for CNUMPS's Program Review is organized by the CNU Office of Institutional Research, Quality, and Assessment (OIRQA). In June of 2020, the OIRQA established the timeline for review and provided institutional assistance to build a data dashboard and data management plan that collected, verified, and analyzed the CNUMPS data. Through the office of CNUMPS Dean, the process was implemented in consultation and collaboration with administrative leaders. From Fall 2020 to the present, the CNUMPS Director has provided data for the faculty program review group to conduct a program self-study. Faculty have overseen the evaluative aspects of this program review and the results of the self-study have been consolidated into this report by the Program Review Committee.



Next steps include an external review and written report, including recommendations for improvement. Agreed-upon Findings and Recommendations will then be deliberated among the member of the Program Review Committee, and senior administrators with decision-making power regarding priority setting and resource allocation. The final product of this program review, a Memorandum of Understanding, will subsequently be integrated into the CNUMPS and institutional planning and budgeting.

Background of California Northstate University, Master of Pharmaceutical Sciences Program.

Development of the Master of Science in Pharmaceutical Sciences (MPS) as master's degree program at California Northstate University (CNU) is a direct extension of the core mission of CNU: *"To advance the art and science of healthcare."* Recipients of this degree will experience a practical, intensive education in basic pharmaceutical sciences designed to acquire critical thinking and life-long learning skills; hone laboratory research skills, expand their understanding of the drug development process and provide unique insight into pharmaco-economics as well as regulatory affairs surrounding the biotech industry. Students will be well-prepared to meet the challenges of this ever-evolving sector and are expected to be



highly competitive in the job market. In addition, the structure of the MPS program is also designed to leverage the scientific background of graduates who want to progress to a higher graduate degree such as Ph.D., PharmD, MD and DMD.

a. Demand: Northern California is home to a rich and diverse array of biotechnology companies and serves as one of the world's major hubs for innovative growth in drug development and biosciences. Consequently, there is a steady demand for qualified applicants in this region. Current economic trends indicate a highly competitive salary profile across the pharmaceutical science areas, such as basic research, biopharmaceutics/pharmacokinetics, biotechnology, clinical research, drug delivery research, drug metabolism, R&D management/administration, pharmaceutical analytic development, pharmaceutical development, preformulation, project management, quality assurance/quality control, regulatory affairs and technology transfer/technical services. The long-lasting pandemic also adds a higher demand for the workforce in building reliable supply chains for the domestic pharmaceutical manufacturers.

b. Supply: Despite this demand, there are limited programs available from Northern California educational institutions that would provide advanced degrees in relevant fields sufficient for a technically qualified workforce. Identified programs are the following: Master of Pharmaceutical Chemistry at UC Davis, Master of Pharmaceutical & Chemical Science at University of the Pacific, Master of Medical Health Sciences at Touro University, Master of Biotechnology at University of San Francisco, and Master of Biochemistry at Stanford University. The educational emphasis of each of these programs is distinct, and likewise, CNU will offer a unique product catered specifically to the needs of the Bay Area biotechnology sector.



c. Program Rationale: The CNUMSP degree is designed to prepare students for a career in academia, the pharmaceutical industry, and government positions after graduation, emphasizing skills that will be required in both the public and private sector workforce. In addition to a solid foundation in pharmaceutical sciences and practical laboratory skills, students will receive training in biostatistics and critical literature review. Courses in the pharmaceutical industry and regulatory affairs are available for candidates seeking a business focus to supplement their scientific training. A foremost emphasis is on a comprehensive understanding of the entire drug development process, from drug design and synthesis to clinical trial development in the era of pharmacogenomics and personalized therapy. Proximity to students attending the CNU Colleges of Pharmacy and Medicine and access to their diverse and competent faculty are leveraged.

California Northstate University's core Mission – *to advance the art and science of healthcare* - is well-served by the development of the MPS program. With an academic culture primed for pharmaceutical research coupled to a strong desire to positively impact the biotechnology

community, the MPS program is the perfect mechanism to advance both its Mission and its Vision to provide innovative education and healthcare delivery systems.

Advance the Art and Science of Healthcare:

1. Through *EDUCATION*; CNUMPS seeks to promulgate a culture and habit of life-long learning for its graduates.



2. Through *SCHOLARSHIP*; CNUMPS seeks to cultivate leaders in pharmaceutical sciences, basic science, translational, clinical, and educational research to develop innovative educational materials and processes, and to establish thought-leaders in science and education by fostering an environment of inquiry within the program.

The successful program development of the CNU health profession colleges, including College of Pharmacy, College of Medicine and College of Health Sciences, led to the eventual establishment of CNUMPS. An initial strategic outline for the program was developed in January 2017 by the Board of Trustees, University President, Vice President of Biotechnology, Dean of the College of Pharmacy, and academic consultants. Due to dedicated leadership, funding, and resources provided by local healthcare community members, much of the preliminary design of the structure of CNUMPS and its curriculum was in place by July 2017 with the following FIVE Program Learning Outcomes (PLOs):

PLO 1: Foundational Knowledge in Pharmaceutical Sciences - Demonstrate the knowledge, skills, attitudes, and ethics that are required of scientists and scientific advocates.

PLO 2: Research Instrumentation and Laboratory Techniques of Pharmaceutical Sciences - Utilize research instrumentation and basic laboratory techniques in pharmaceutical sciences.



PLO 3: Critical thinking skills - Apply critical thinking and problem-solving skills to develop, test, and produce pharmaceutical products.

PLO 4: Communication skills - Demonstrate written and oral communication skills needed for a career in pharmaceutical sciences.

PLO 5: Scientific and technique development - Promote scientific and technique development in pharmaceutical sciences.

CNUMPS successfully completed all necessary planning and accreditation procedures and received approval from WSCUC (regional and institutional accreditor) to begin offering the Master of Pharmaceutical Sciences degree in August 2018. Immediately, the inaugural class of three students were matriculated in September 2018.

Despite our short history, we have already begun to see the fruits of our commitment and the impact on our students. For instance, all graduates of our inaugural class have pursued a successful career: one graduate is currently working in a pharmaceutical company, second graduate is currently working as an instructor in academia, and the third graduate is currently matriculated in a PharmD program. Of the current class_2021 of 27 students, who just graduated in May 2021, 13 students will join the CNU College of Medicine in Fall 2021. In addition, MPS students, faculty, and staff regularly volunteer at community health fairs and engage in local science events. The MPS program is the main organizer and sponsor for the CNU Annual Diversity Summer Camp, which aims to leverage and increase the awareness of health

profession careers among careers among the high school students of minority background such as African American and Latino.

II. Analysis of Evidence about Program Quality and Viability.

1. Student Data

Fig. 1. Number of applications

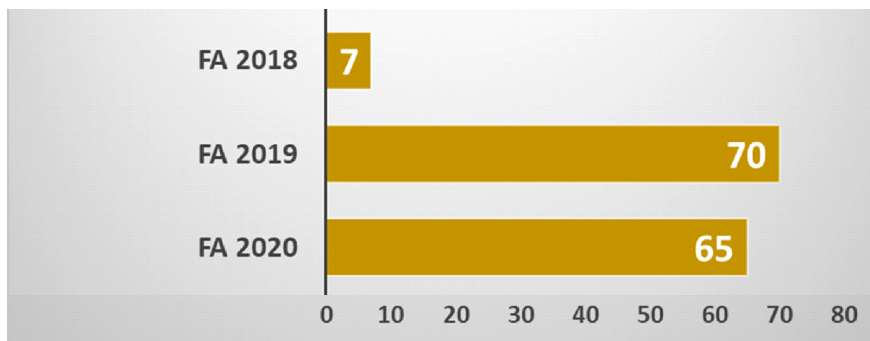


Fig. 2. Number of matriculating students.

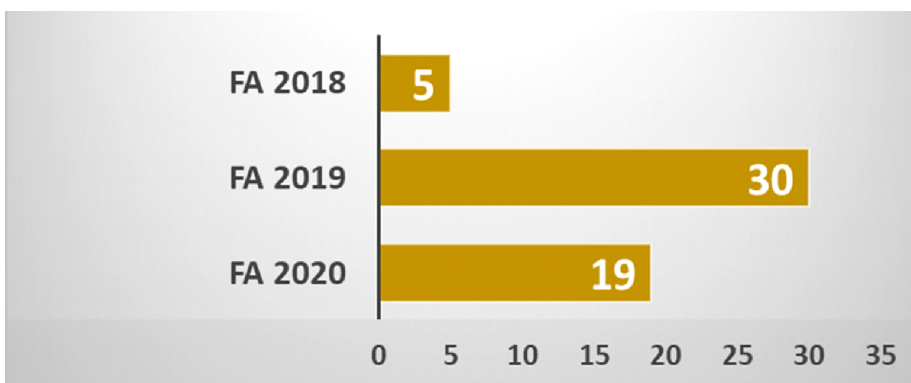


Fig. 3. Undergraduate GPA of matriculating students.

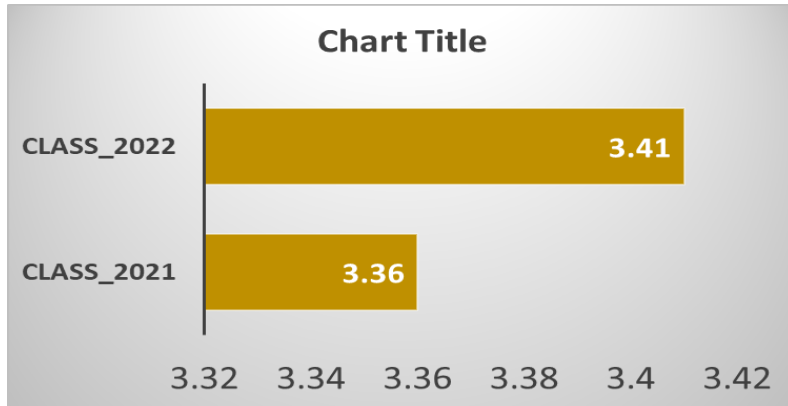


Fig. 4. Ethnicity of

matriculating students

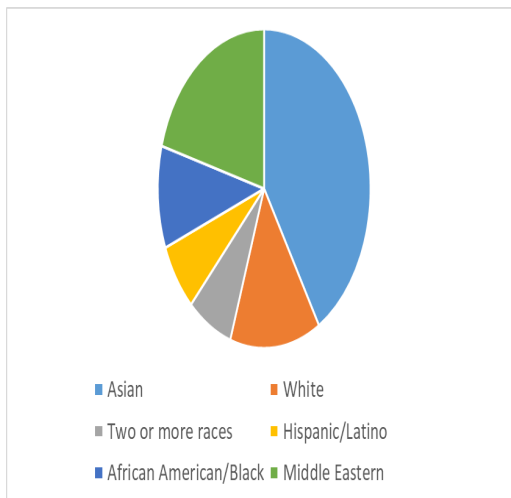
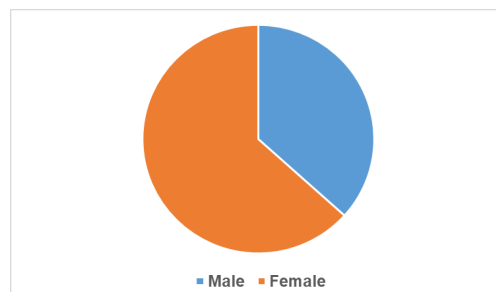


Fig. 5. Gender of matriculating students



2. The Curriculum and Student Learning Success

Table 2: *CNUMPS Program Calendar*

First Year				Second Year			
Fall Semester	Credit	Spring Semester	Credit	Fall Semester	Credit	Spring Semester	Credit
MPS501 (Intro. Pharma. Sci. I.)	3	MPS502 (Pharma. Tech.)	2	MPS512 (FDA reg.)	3	MPS518 (Pharmaceutics/Delivery systems)	3
MPS513 (Biostat.)	3	MPS511 (Intro. Pharma. Sci. II.)	3	MPS514 (Clini. Biochem.)	3	MPS506/507 (Res.Thesis II./Capstone Paper II.)	3
MPS515 (Med. Immunol.)	3			MPS506/507 (Res.Thesis I./Capstone Paper I.)	3	MPS.Elective (if not taken in the Fall)	2
				MPS.Elective	2		

MPS didactic courses were designed to leverage the scientific background of graduates who want to pursue their career in pharmaceutical industry or who want to progress to higher graduate degrees such as PharmD, MD or Ph.D (Appendix 2, MPS courses' descriptions). MPS students need to complete 31 credits to earn the MPS degree. MPS courses in the first year comprehensively address the foundations of pharmaceutical sciences including the pharmacology of all body systems and the different approaches of drug design based on drug target and administration method. Also, in the first year, the students are prepared for their MPS research activities by learning about the fundamental pharmaceutical laboratory techniques and learning about research methods and biostatistical approaches required to carry out and analyze either



clinical or experimental research. In the second year, the MPS students have the option to choose between either ***“Thesis Track (Wet Lab Research Work)”*** or ***“Capstone Paper Track (Dry Research Work)”***. The didactic core courses of both tracks are the same for all students. The only major difference in the tracks is the Thesis course or Capstone Paper course. Either Thesis or Capstone Paper course has two parts (I. and II.) offered during the fall and spring, respectively, of the second

academic year. MPS faculty have multidisciplinary expertise in different fields of pharmaceutical and biomedical sciences including molecular pharmacology, medicinal chemistry, immunotherapy, drug screening, virology, molecular biology, phytochemistry and natural products, pharmaceuticals and drug delivery systems, and clinical trials. MPS students are encouraged to connect with faculty members to learn more about their research activities. During the Orientation Day, MPS faculty use power-point presentations to describe their research focus to incoming students and invite participation at all levels of research. During the first academic year, MPS students are also encouraged to volunteer for one of the MPS faculty laboratories to gain research and professional experience. Accordingly, by the second year, the MPS students will build sufficient background that will enable them to decide which track that they would like to pursue and which faculty to work with. Indeed, MPS students are involved in several hypothesis-driven research projects for the thesis and capstone paper. MPS research projects address a wide range of subjects in pharmaceutical sciences. Many MPS projects result in oral or



poster presentations at regional and national meetings, and some have been published in peer-reviewed biomedical journals (please see the list of MPS faculty publications).

One of the characteristic courses of the MPS curriculum is the “*FDA Regulations*” in which the students get comprehensive and detailed knowledge regarding all steps and stages required by USA FDA to approve any new drug or cosmetics for human usage. Also, it is important to mention that *journal seminar activity* is integrated in all MPS courses which train the MPS students to search for, review, discuss, present, and cite recent relevant literature.

Within all MPS courses, Course Learning Outcomes (CLOs) are published in the syllabi for all courses. Student achievement of CLOs is assessed using summative, customized multiple-choice exams. For each exam, teaching faculty and course directors choose question items based on the relevant content, mapping each question to the CLO and, thereby, to the program learning outcomes. Mapping of summative exam questions to disciplines and CLOs allows for reporting of overall student performance as well as specific performance as related to disciplines and CNUMPS CLOs. Average student performance on a given CLO of less than 70% attainment of the outcome is identified as an “Introduced” stage; if performance averages between 70% to 79%, attainment is designated as “Developed”; when attainment is between 80%-89%, this level of achievement is declared as “Mastered” and greater than 90% is considered “Outstanding.” In review of each course, the Assessment and Evaluation Committee reviews CLO attainment and identifies areas for improvement in its report to the course director. The director can then utilize this data in post-course discussion and identify a plan of action if needed.

In the short time that CNUMPS has been in operation, we have made good strides to ensure course lessons reflect CNUMPS's CLOs. As shown in Table 3 for an example of MPS513 Biostatistics and Research Methods, CLOs have never been below a "Proficient" stage.

Table 3. *Sample of student performance on CLOs for final exam of MPS513 Biostatistics and Research Methods (Fall 2020).*

Content area	N items	Reliability*	Mean %	Low %	High %
Total Test	60	0.9	88	57	98
CLO1	50	0.9	90	75	99
CLO2	30	0.87	88.1	58	97
CLO3	25	0.85	88.3	60	99
CLO4	40	0.8	86	59	95

* Likelihood of students repeating the same performance.

In addition to summative assessments and assignments, formative assessments in the form of in-class group discussion are implemented in all MPS courses to support ongoing course director and student appraisal of learner understanding throughout the course. Every course in the MPS has established clear learning objectives and every course uses a dialectic approach, observations, self-reflection, and record keeping thereby enhancing student learning. Based on the overall average grades of summative and formative assessments, we assess students'



performance in each course on the five PLOs and identifies where each PLO introduced, developed, or mastered (*Table. 4*).

Table 4. Assessment of class_2021 performance in each MPS course on MPS – PLOs.

Course code	PLO1	PLO2	PLO3	PLO4	PLO5
MPS 501	M		D	I	
MPS 511	M		D	I	
MPS 502		M	D		M
MPS 506		D	D	D	M
MPS 516		M	M	M	M
MPS 507	I		D	D	
MPS 517	D		M	M	
MPS 512	M		D	D	
MPS 513			D	D	
MPS 514	D		M	D	
MPS 515	D	I	M	D	
MPS 518	M	I	M	D	
MPS 601	D			M	
MPS 602				M	D

I; Introduced
D; Developed
M; Mastered

PLO 1: Foundational Knowledge in Pharmaceutical Sciences - Demonstrate the knowledge, skills, attitudes, and ethics that are required of scientists and scientific advocates.

PLO 2: Research Instrumentation and Laboratory Techniques of Pharmaceutical Sciences - Utilize research instrumentation and basic laboratory techniques in pharmaceutical sciences.

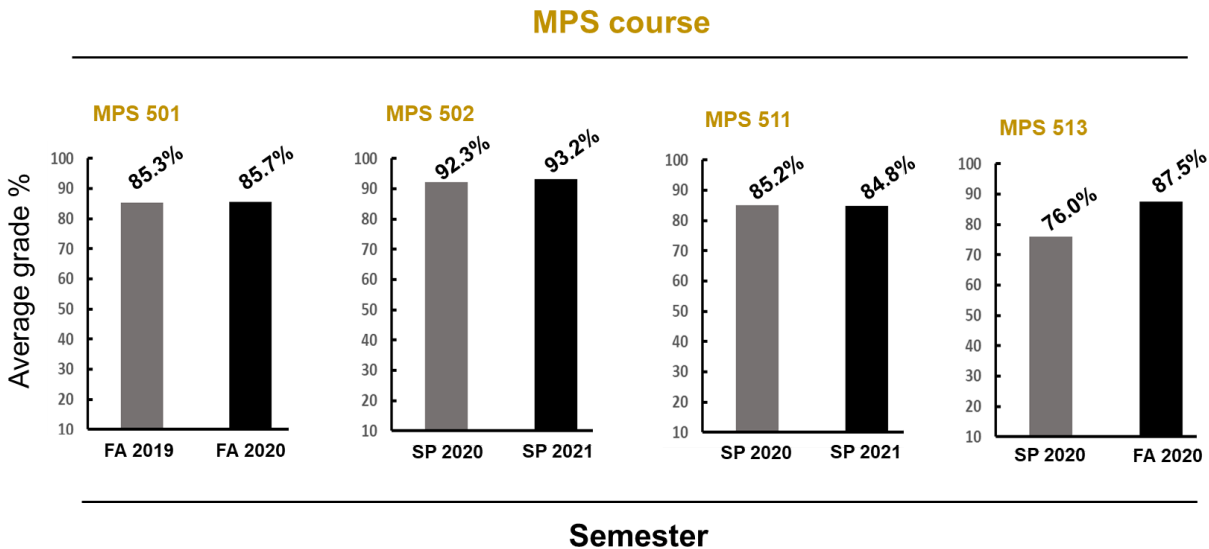
PLO 3: Critical thinking skills - Apply critical thinking and problem-solving skills to develop, test, and produce pharmaceutical products.

PLO 4: Communication skills - Demonstrate written and oral communication skills needed for a career in pharmaceutical sciences.

PLO 5: Scientific and technique development - Promote scientific and technique development in pharmaceutical sciences.

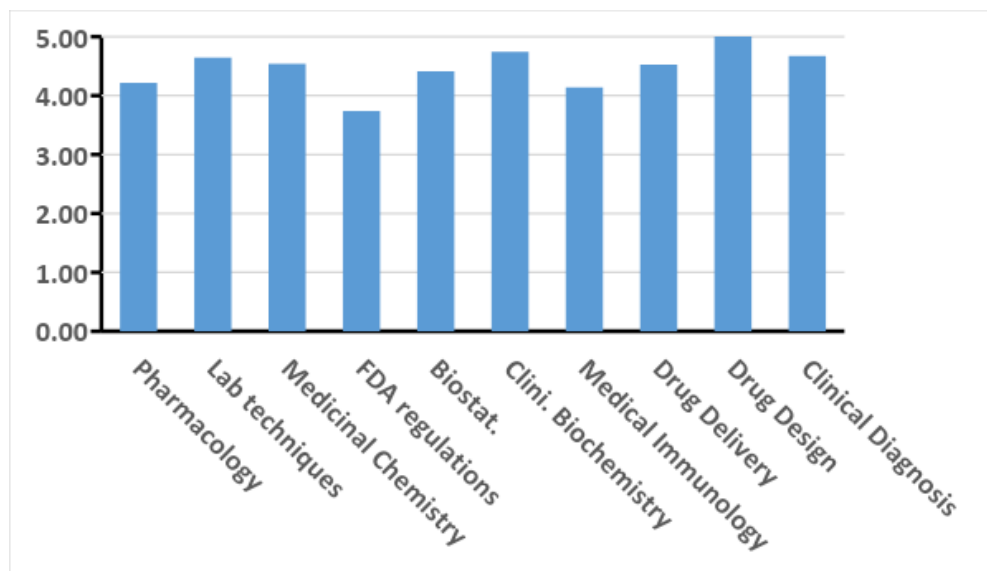
Also, it is important to mention that each semester, a grade distribution report is routinely compiled as part of the process to evaluate and establish students' "Satisfactory Academic Progression" within each course. The following is an example of comparison data from the most recently completed academic years. Figure 6 illustrates the average grades for MPS courses that had been offered for at least two semesters. Overall, most classes either have maintained the same performance or have outperformed the previous class. Interestingly, the average grade for the majority of MPS courses falls in the upper 80s percentile.

Fig. 6. Grades distribution



Importantly, each course and teaching faculty are regularly assessed by student evaluations at the end of every course (Appendix 3; example of course and teaching faculty student evaluations). Figure 7 illustrates the average score of student evaluation for MPS didactic courses of 2020 – 2021 academic year. Overall, the average of student evaluation scores for all MPS courses ranged from “*meet the expectations*” to “*consistently exceed the expectations*”. Student evaluations have been instrumental in the reorganization of content delivery yielding courses that have proven to be more efficient and well-received by students and faculty alike. Results of student evaluations are then shared to respective faculty, course director, the MPS director and finally the Dean to inform decision-making and continuous quality improvement.

Fig. 7. Average of student evaluation scores for MPS course.



CNUMPS's Curriculum and Assessment Committee is comprised of various stakeholders to ensure shared governance. From the Curriculum and Assessment Committee, curricular proposals are presented to the Dean to evaluate the alignment with the University's mission, academic rigor, compliance with accreditation requirements, budgetary and programmatic feasibility, potential challenges, and short- and long-term impact on other programs. Approved recommendations are then transmitted to course directors for consideration and implementation. The Curriculum Committee continually seeks input from course directors, faculty consultants, and MPS students so that a broad consensus may be reached. Accordingly, the Curriculum and Assessment Committee developed a comprehensive Educational Effectiveness Assessment Plan



(Appendix 4) to ensure continuous assessment for the student learning success. This plan covers the whole assessment spectrum, including implementation of appropriate assessment tools, evaluation timing, required benchmark target, analysis of the results and finally actions needed.

The Curriculum Committee is sensitive and remains responsive to the needs of students, the overall curriculum, and individual courses. For example, we observed that many students were opting to take the capstone paper track option rather than the thesis option for their master's project. Accordingly, we redesigned the capstone paper project to ensure it was as rigorous as the thesis, and we made students aware of the standard of work expected in the thesis and capstone paper. Also, we asked the students why they chose the capstone paper option rather than the thesis option, and many said that the capstone paper option gave them flexibility in organizing their time schedule to be able to study for the MCAT as many of the students would like to pursue medical school. Also, one of the common recommendations in the annual student evaluation of MPS514 "Clinical Biochemistry" for Fall 2020 is that the students want a second part of this important course related to the diagnostic techniques. Indeed, the Curriculum Committee responded immediately to this suggestion as the course director of MPS514 offered an elective course MPS602 "Trends in Clinical Diagnostics" in the following Spring 2021 which addresses the technical approaches of the pathological cases discussed in the core course. Curriculum committee members constantly evaluate the gaps and redundancies of MPS curriculum.



3. Student awards

Student academic, cultural and community services achievements are always recognized by the MPS program through multiple awards. Examples of student awards are listed below.

Table 5. *MPS student awards.*

<i>2019 – 2020</i>		<i>2020 - 2021</i>	
Award	Recipient	Award	Recipient
<i>President's Award</i>	Bahaar Muhar	<i>Dean's Excellence Academic Award</i>	Satori Iwamoto
<i>Dean's Excellence Academic award</i>	Michael Roche	<i>MPS Research Award</i>	Olivia Wu
<i>MPS Organization Award</i>	Joshua Anwuli	<i>MPS Leadership Award</i>	Natali Chavez
<i>MPS Tutoring Award</i>	Victoria Jiang Angela Penny	<i>MPS Community Service Award</i>	Bahaar Muhar
		<i>MPS Inclusion and Diversity Award</i>	Joshua Anwuli Shayla Moore

4. Student governance

The MPS Dean, Director and faculty consider the student recommendations and feedback seriously. The MPS program offers multiple channels for the students to express their voices. Among the most important channels for student governance and voice are the MPS student organization (MPS.org) and the MPS Town Hall Meeting. The student board of MPS org. is elected at the beginning of each academic year through the students without any interference from

the MPS administration or faculty. The board organizes all student activities within coordination with the MPS administration (Appendix 5. MPS org. constitution). For example, MPS student organization with a collaboration with MPS administration are responsible for organizing the MPS Town Hall Meetings which are held twice per semester. These meetings are quite important for the program as the students express their voice and suggest recommendations or changes to improve the program. Two weeks before any MPS town hall meeting, the MPS org. collects any recommendations, suggestions, or feedback regarding the MPS courses and program services from all MPS students. Then, during the meeting, the students discuss these issues in a very open conversation with the MPS Dean, Director, and faculty (Appendix 6 showing example of one of the MPS town hall meeting). Indeed, many of the program adjustments were implemented based on the outcome of the MPS Town Hall meetings. For example, during the



second MPS town hall meeting in the end of spring 2020, the students suggested offering MPS513 (Biostatistics and Research Methods) in the first fall of the program instead of the spring because this course will help the students to be familiar with different analytical and research methods before they start their thesis/capstone paper projects. Accordingly, in the following fall 2020, which was the first fall for class_2022, the MPS513 course was offered.

Also, the MPS administration with a collaboration with MPS student organization initiate the monthly MPS Update Newsletter, which is very helpful to maintain the current and prospective MPS students connected and updated about the student activities and achievements (Appendix 7, example of MPS Update Newsletter).

5. Student Scholarly Activities

- ***Thesis/capstone paper projects and publication.***

The thesis and capstone paper projects resulted in produced valuable data in different pharmaceutical and biological fields, including virology, immunology, drug delivery system and medicinal chemistry. Many of these projects are either in preparation for publication submission in peer reviewed journals or already published (Appendix 8 shows the titles of thesis and capstone projects for class_2021). Also, the MPS students along with the MPS faculty are currently working on a book chapter addressing “Biologics and Biosimilars”.



Student publications

1. **Hannah E. Neiger**, Emily L. Siegler and Yihui Shi. Breast Cancer Predisposition Genes and Synthetic Lethality. International Journal of molecular sciences, 2021 *In press*.
2. Samar Tawfik, **Mengyao Liu** and Abdelbasset Farahat. Antiviral activity of thiadiazoles, oxadiazoles, triazoles and thiazoles. Archive for Organic Chemistry, 2020.

Student scholarly awards.

The research of MPS students has been also recognized in the Annual CNU Research Symposium. In 2020, the MPS students (Mary Jabari, Bahaar Muhar and Michelle Sendrovidish) all received best poster prizes. Also, in 2021, Mary Jabari and Hannah Nieger received the prize of best oral presentation for basic sciences.

6. Student Support

The University offers student support in a number of ways. The Office of the Program Director develops and oversees programming to assist students in the areas of academic support, career advising, and wellness.

a. Academic Advising: CNUMPS has an academic advising program aimed at aiding struggling students. Attention is given to both pre-remediation and remediation measures. Two MPS faculty are assigned as academic advisors for each class of both MPS classes (MPS1 and MPS2). The *academic alert process* is used as an early warning sign for a



student experiencing academic difficulty. If a student achieves a score of <70% on a formative or summative examination, or if the Course Director has concerns about a student at any time during the course, an alert is triggered. This action results in notification of the student, the class advisors, and the MPS Director. The class advisor meets with the student to ascertain the source of the difficulty and to assist the student in developing a plan that will translate into academic success. The student may need referral for peer tutoring, mental health counseling, development of study skills, time management, or cognitive testing. The Course Director or student may choose at any point in time to meet separately or collectively with the Dean for additional support and planning. A student can receive academic alerts for multiple courses or multiple times within the same course. Progress is monitored on an ongoing basis throughout the semester, and interventions become more robust if expected progress is not achieved. Student engagement in the process varies, and this factor is considered at the end of each semester if a student's

progression into the next semester is under threat. It important to point out that in our planning, we consider that students during their first year may need more assistance because they are still adjusting to the CNUMPS program, expectations, and campus culture. The Offices of the Dean and Program Director understand this and prepare appropriately. Since fall 2019 courses, we have an average of 2 academic alerts each semester for both MPS1 and MPS2 classes.

Table. 6. *Academic alerts for 2020 – 2021 academic year.*

MPS class	MPS1		MPS2	
Semester	FA 20	SP 21	FA 20	SP 21
Class size	19	19	25	25
# Of Academic Alerts	2	2	0	0
# Students received Academic Alerts	2	2	0	0
# Student Received 3 or more Academic Alerts	0	0	0	0

b. Tutoring: Students experiencing difficulty in the coursework are urged to seek the help and assistance of the Course Director. Faculty are available during office hours and provide additional support through review sessions. If academic challenges arise, free tutoring services are available through the Office of MPS Director. Students requiring this assistance may be referred by a course faculty member, or MPS director. Tutoring is offered in two formats; i. group tutoring which is available for any MPS student, and

ii. one-on-one tutoring which is only available for students on academic alerts. The tutoring service is offered with a maximum of two hours per week for five weeks.

c. MCAT support. Given the fact that many of our students would like to continue their career as medical profession students after graduating from the MPS. The MPS program offers MCAT support through; 1) establishing an MCAT study group led by a volunteer



medical student with a good experience in the MCAT. The MPS program pay a tutoring fee for this medical student, 2) buying several versions of AAMC-MCAT practice tests and offer them to the MPS students, and 3) inviting the KAPLAN team to our campus twice per year in the beginning of spring and summer to offer one-month comprehensive MCAT practice course.

d. Software support. The MPS program provides the students with important software packages that are critical for their theses or capstone paper projects, such as EndNote for reference management and Prism for biostatistical analyses.

e. Career advising. Career advising programming is developed and managed by the Office of MPS Director. It begins at orientation and continues through the second year. Career advising and planning is accomplished through Pharmaceutical Industry career advising, career advising workshops, participation in health fairs, and outreach activities of MPS organization.

f. Student Wellness. CNUMPS students are actively involved in supporting the mental and physical wellbeing of the student body through involvement in the MPS organization. MPS organization can plan various wellness activities throughout the academic year with financial and management support from the Dean office. MPS student organization has



organized multiple potlucks, game nights, social events and talent shows over the academic year. Also, we end the academic year with the *Annual MPS Banquet* that is held on the eve of graduation day to celebrate and greet the graduating class.

g. Mental Health Services. Two of three licensed therapists are on campus every day of the week, with varying hours to accommodate students' schedules. These counselors do not teach any classes nor have any evaluative academic role in the students' curriculum. An office has been provided (Counseling Office Rm #157) that offers privacy, and white noise machines have been employed to minimize the possibility of conversations being overhead by other parties. A new office is also being constructed to provide students a location to meet privately with the therapists away from the main campus. Appointments can be requested through email or over the phone. Along with individual therapy, the counselors have been made available to students for a variety of group sessions and workshops covering topics such as stress, depression, and healthy relationships. The counselors are also available for faculty consultations and behavioral assessments and have also been active participants in CNU events, including student orientation, club day, suicide awareness and prevention programs, wellness day, and time management events. Due to increasing usage of counseling services and attendance at counseling-developed workshops and events, counseling hours available to students have increased, and the number of counselors working with CNU students has increased from two to three.

h. Financial Support. While CNU does not participate in the Title IV (federal student loan) program, a number of competitive educational financing options are available for



those who qualify (see Appendix V). The available financial aid mechanisms that have been put

in place to educate students about their educational expenses are clearly explained for the MPS students during multiple occasions, including interview day, orientation day, student entrance loan counseling workshop, student exit loan counseling workshop and financial literacy workshops.

i. IT Support. CNUMPS is served by an enterprise-grade wireless network utilizing state-of-the-art access point hardware. All areas are served by 802.11a/b/g/n capable hardware to ensure the utmost in current, future and legacy availability. The network is designed with overlapping fields of radio connectivity to ensure maximum connection uptime, and students are granted access through a secure password protected dedicated SSID. The network is constantly monitored by a network engineer for availability, bandwidth, and potential congestion issues. The campus has dual high-speed fiber optic lines supplied through local data and communication companies, Consolidated Communications and Frontier Communications, for data redundancy and increased bandwidth resources. Faculty and students at off-campus locations have full access to CNUMPS's educational and reference resources through secured and authenticated access resources. Continuity of access and accessibility of University resources is prioritized so students can engage with teaching materials, conduct research, print, review their student records, etc. at all times.



j. Facilities. CNUMPS has a teaching facility that sufficiently supports the education of MPS students and provides an active learning environment and experiences by exposing MPS students to hands-on techniques and skills in the classrooms, and laboratories. The main facilities are located on the second floor of the CNU building. CNUMPS has one very large classroom auditorium (10,000 square-feet of total space), with a seating capacity of up to

60 students. CNUMPS also has approximately 2,100 square feet of dedicated research space. The research laboratory has molecular biology lab, tissue & culture lab, microscope lab, cell lab, pharmacology lab and virology lab and etc. It is fully equipped with advanced imaging systems, cryogenic storage units, environmental/growth chambers, PCR, 500 MHz NMR, and water purification systems. Students have access to the lab during the building's normal business hours of operation and after-hours access through a secure card system. The building is open Monday through Friday from 7:30am-11:30pm and on weekends (Saturday through Sunday) from 8:00am-10:00pm.

In addition, the adjacent building has been renovated and developed to serve as the CNU Event Center. The Center is utilized equally by CNU colleges. This building provides an additional 15,000 square feet of space and was acquired for the purpose of increasing space for students to study, relax, enjoy recreational activities, and to provide a venue (with a movable stage) for the hosting of major events. Furthermore, the new building allows for the addition of seven private student study rooms (five students per room),



four semi-private study rooms (five to six students per room), and eight individual study carrels. There is a large open study lounge that can accommodate up to 400 students. There are also a workout center, a recreation center with two billiard tables and two ping pong tables, a preparation kitchen, and an audio-visual control room.

CNU strives to provide a safe and secure environment for students while they are on campus. The campus security system includes an on-site (unarmed) security guard during the day and until midnight to patrol the campus and parking lot, to escort students, faculty, or staff to their cars after dark. CNUMPS solely uses card-access to enter the campus during

business hours and after-hours. The access cards are only granted to registered MPS students, faculty, and staff of CNU. CNU periodically hosts information sessions or workshops on comprehensive emergency and disaster planning.

The security at affiliated community hospitals (Kaiser, Dignity, AHMC, Sierra Vista, and Heritage Oaks) is even higher due to the regulations for staff and patient safety. This includes greater levels of patrolling security guards with around-the-clock coverage as well as emergency and disaster planning.

7. Student Satisfaction

As part of the self-study and program review, student satisfaction survey was carried out by the CNU office of Assessment for all CNU students. This survey serves to assess, commend, and



critique the program education and services. The results reflect the satisfaction of the students with the MPS program in different aspects as follow (Appendix 9):

All participants (100%) Agreed or Strongly Agreed that:

- Academic alert advisement process is effective (if applicable).
- The academic advisement process is effective.

Almost all of the participants (> 90%) Agreed or Strongly Agreed that:

- The campus provides sufficient study and lounge areas.
- The college provides opportunities for engaging in active learning.
- The college provides career services such as informational workshops (ie: resume-writing, interviewing, etc.) that are helpful to advance their prospective career.

The assistance provided by the Dean and Program Director Offices meets their needs.

- The University provides sufficient study space.
- Electronic learning management systems (CANVAS, TurningPoint, CoreELMS, etc.) are conducive to learning.
- The campus is safe.
- The building hours are sufficient.
- Restrooms are clean with adequate paper and soap supplies.
- Diversity is respected and valued within the college.

A majority of the participants (> 80%) Agreed or Strongly Agreed that:



- College faculty are accessible and helpful .
- Tutoring services are useful (if applicable) .
- They have the opportunity to be a part of clubs and professional organizations on campus
- College/school provided access to financial aid.
- Access to educational resources (e.g., library, electronic databases) is conducive to learning.
- Classrooms are clean and tidy.
- Heating and Air Conditioning in the classrooms provide a comfortable learning environment.
- The campus cafe and food services are sufficient for their needs (such as microwaves, refrigerators, and vending machines).
- Counseling services are sufficient to meet their needs.

Approximately three-fourths of the participants (> 70%) Agreed or Strongly Agreed that:

- The classroom set-up is appropriate for learning.
- The college or school administration responds to problems and issues of concern to the student body in a timely fashion.
- College faculty are effective teachers.
- The guidance and processing from Financial Aid is sufficient.
- IT support services are sufficient.

More than half of the participants (> 60%) Agreed or Strongly Agreed that:

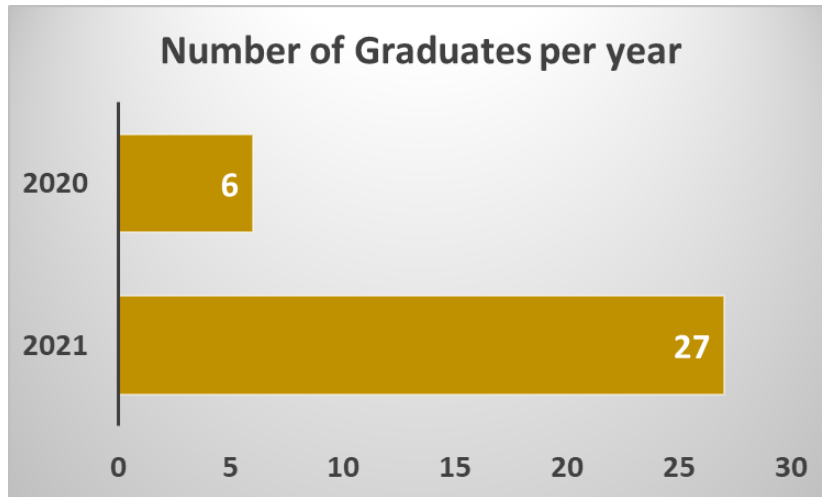


- They feel that they are respected at the college.
- The college clearly outlines and communicates the requirements of its academic program.
- A process exists by which they can express their concerns regarding the academic program.
- I understand the process for resolving academic and other issues.
- They know how to use the appropriate channels for grade appeals.
- IT resources (wireless network, AV projectors, microphones, etc.) are conducive to learning.

8. Graduation Rate.

In 2020, we have 100% graduation rate as all 6 students enrolled in 2018 were able to successfully complete the graduation requirements. All students were successfully passed, (i) each MPS core didactics course and (ii) dissertation defense of either Research Thesis or Capstone Paper project. Accordingly, each student has completed 31 credits required to complete the MPS program. In 2021, 96.4% graduation rate as 27 out 28 students were able to successfully complete the graduation requirements.

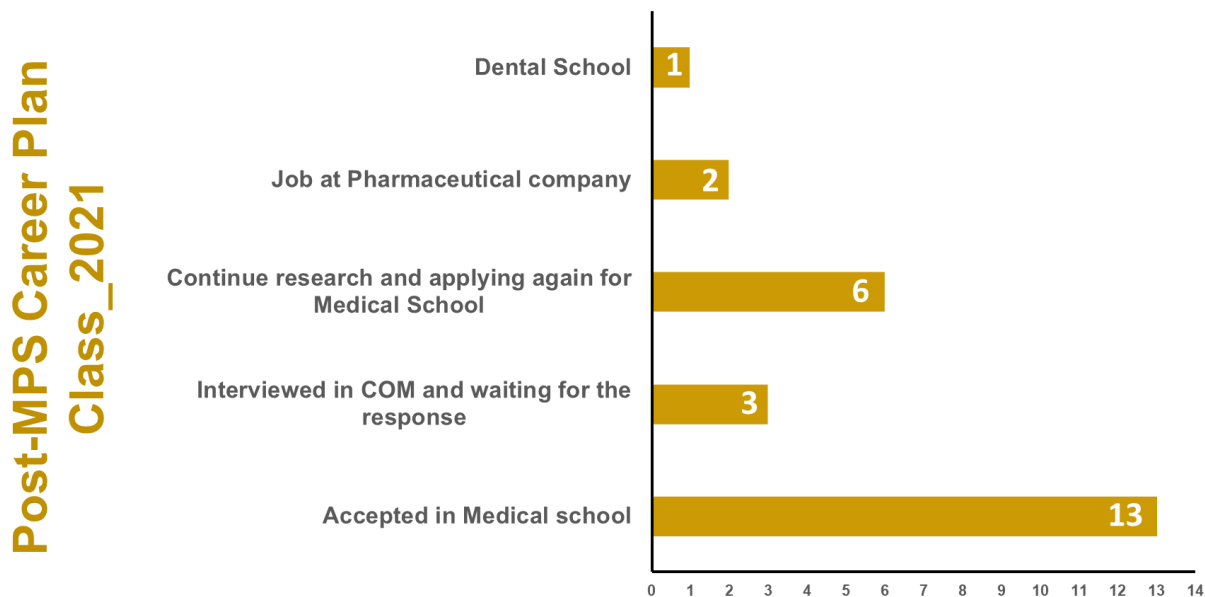
Fig. 8. Graduation rate.



9. Post-graduation career development.

An exit survey is used to create a database of graduation students and to encourage their ongoing engagement with the MPS program for future program improvement. Informal records are kept for employment and enrollment in doctoral or professional program. Here we summarized the outcome of the exit survey presented to the most recent graduating class (class_2021). The outcome showing that the MPS program was a great help to most of the graduates to pursue their career to either advanced graduate degree, especially MD, or career in pharmaceutical industry. Among the 27 graduates of class_2021, 16 (59%) were either accepted or interviewed in medical schools. It is important to mention that before completing the MPS program, none of these 16 students received even an interview invitation from any medical schools.

Fig. 9. Post-graduation career development.



10. Faculty

All CNUMPS faculty have a PhD in their respective specialty areas of instruction. A full list of faculty credentials and their teaching courses are displayed in table 7.

Table 7. MPS faculty

MPS Faculty	Title	course
Dr. Catherine Yang	Professor of Molecular Pharmacology and Clinical Biochemistry	a. Pharmacology b. Clinical Biochemistry
Dr. Ahmed El-Shamy	Assistant Professor of Virology	a. Biostatistics

		b. Emerging viruses
Dr. Simeon Kotchoni	Associate Professor of Physiology and Biochemistry	a. Clinical Biochemistry b. Clinical Diagnosis
Dr. Hazem Ali	Associate Professor of Pharmaceutics and FDA regulations	a. FDA regulations b. Drug delivery systems
Dr. Hongbin Wang	Assistant Professor of Pharmacology	a. Pharmacology b. Lab tech.
Dr. Abdelbasset Farahat	Assistant Professor of Medicinal Chemistry	a. Medicinal chemistry b. Drug Design
Dr. Eslam Mohamed	Assistant Professor of Medical Immunology	a. Medical Immunology b. Advances in Immunotherapy

a. Faculty Research and Scholarship

Publications:

1. Álvaro de Mingo Pulido, Kay Hänggi, Daiana P Celas , Alycia Gardner, Jie Li, Bruna Batista-Bittencourt, **Eslam Mohamed**, et al. The inhibitory receptor TIM-3 limits activation of the cGAS-STING pathway in intra-tumoral dendritic cells by suppressing extracellular DNA uptake. *Immunity*, 2021 *In press*.
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3. **Hannah E. Neiger**, Emily L. Siegler and Yihui Shi. Breast Cancer Predisposition Genes and Synthetic Lethality. *International Journal of molecular sciences*, 2021 In press.
4. Doyle EH, Aloman C, **El-Shamy A**, Eng F, Rahman A, Klepper AL, Haydel B, Florman SS, Fiel MI, Schiano T, Branch AD. A subset of liver resident natural killer cells is expanded in hepatitis C-infected patients with better liver function. *Scientific Reports*, 2021.
5. Wang C, Yuan W, Hu A, Lin J, Xia Z, **Yang CF**, Li Y, Zhang Z. “Dexmedetomidine Alleviated Sepsis Induced Myocardial Ferroptosis and Septic Heart Injury”. *Mol Med Rep*. 2020 Jul;22(1):175-184. doi: 10.3892/mmr.2020. 11114. Epub 2020 May 4. PMID: 32377745.
6. Malhotra, A., Brady, D., Kreys, E., Silva, J., Feng, X. and **Yang, C.**, “Development, implementation, and assessment of a comprehensive, integrated, and multimodal interprofessional education (CIM-IPE) program”, *J. Interprofessional Education & Practice*, 2020, 21, 100356.
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8. Shim, K., Begum, R., **Yang, C. and Wang, H.**, “Inflammation; Complement activation; Metabolic disorders; Obesity; Insulin resistance; Type 2 diabetic mellitus”, *World Journal of Diabetes*, 11, 26, 2019.



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10. Coifman, R. E. and **Yang, C. F.**, "Vaccine Delivery by Precipitation (VDBP) Induces Tolerance to Poison Ivy", *Annals of Allergy, Asthma and Immunology*, (2019), 122, 331-352.
11. **Yang, C. F.** and Caputo, G., "Experiments in Biochemistry and Biotechnology" by Cengage Learning, 2019 (Book).
12. Xiangqi Zhang, Junjun Chen, Jiao Yang, Meizhi Shi, Meijun Qi, Xiao Xiao, **Hongbin Wang**, Yonglong Han. Enhances of the inhibitory effect of paclitaxel on the proliferation of ovarian cancer A2780 cell by Xiaoaiping injection via modulating nuclear receptors. *Herald of Medicine*, 2019; 38(6):693-670.
13. Ronia Mostofa; Rayhana Begum; **Hongbin Wang**; et al. Promising antidiabetic potential of *Cuscuta reflexa* leaves methanol extract in alloxan-induced diabetic rats. *Clinical Phytoscience*. (*In press*)
14. **Abdelbasset A. Farahat**, Pu Guo, Hadir Shoeib, et al. Small Size Sequence-sensitive Compounds for Specific Recognition of G·C Base Pair in DNA Minor Groove. *Chem. A. Eur. J.* 2020.

15. Sabine Depauw, Melanie Lambert, Samy Jambon, Ananya Paul, Paul Peixoto, Raja Nhili, Laura Marongiu, Martin Figeac, Christelle Dassi, Charles Paul-Constant, Benjamin Billoré, Arvind Kumar, **Abdelbasset A. Farahat**, et al. Design, Molecular Evaluation, and Cellular Consequences in HOXA9-Dependant Leukemia Cell Model.. J. Med. Chem. 2019, 62, 1306–1329.
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18. Abdel-Maksoud NHM, **El-Shamy A**, Fawzy M, Gomaa HHA, Eltarabilli MMA. Hepatitis B variants among Egyptian patients undergoing hemodialysis. Microbiol Immunol. 2019.
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Grants.

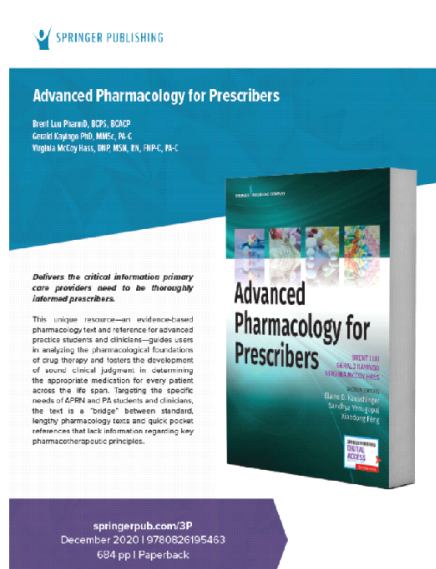
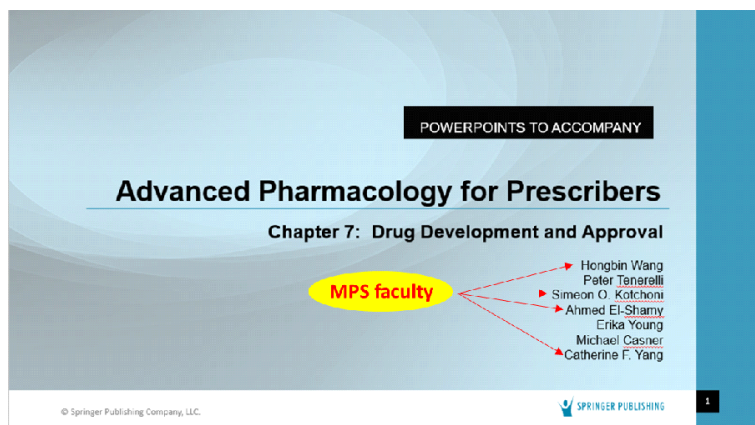
1- Catherine Yang, Ph.D (PI) and Ahmed El-Shamy, Ph.D (Co-PI). Educational Pandemic Grant (\$60,000) funded by ZUEFUSA Education Foundation.

2- Abdelbasset Farahat, Ph.D. Subcontract Medicinal Chemistry grant with Gorgia State University (\$10,000).

4- Hongbin Wang, Ph.D (PI). C4a-PAR1 signaling in metastatic property of non-small cell lung cancer (NSCLC) A549 cells in vitro (\$10,000) funded by CNU College minigrant.

3- Ahmed El-Shamy, Ph.D (PI). Establishment of cell culture-based infectious system for hepatitis B virus (\$5000) funded by CNU College minigrant.

Book authorship



The MPS program has been instrumental in supporting the successful growth of research endeavors within the MPS community. In doing so, we are committed to building an extensive



research infrastructure by increasing seed grants for faculty-initiated research initiatives, fully equipping basic science research laboratories, and establishing the Center for Translational Medicine. Furthermore, we support research endeavors of our MPS students by providing travel grants, symposium poster costs, and academic faculty support to successfully train students in scholarly activities. Additionally, CNUMPS provides support for faculty research in various ways. CNUMPS has established a mini-grant program to foster faculty research. The research mission of CNUMPS is to promote research spanning basic research, translational and clinical research, population sciences and education research. The availability of intramural grant funds dedicated to research comes with the expectation that faculty will mentor MPS students in their research projects and be able to obtain sufficient preliminary data to submit extramural grants to NIH and other funding organizations.

b. *ITLE Grant-Writing Workshop*

CNU's Institute for Teaching and Learning Excellence (ITLE) sponsors grant-writing workshops for all CNU faculty and students. Each two-hour session includes both didactic instruction and small group learning and discussions with panel experts (consisting of faculty with extensive expertise in both federal and private funding mechanisms). Four sessions have been planned for 2020:

- ***Session 1:*** New Investigator Awards and Training Grants (February 25, 2020) Topics: grant components, building relationships, writing a strong mentorship plan Panel members: Drs. Justin Lenhard (CNU, College of Pharmacy), Ruth Vinall (CNU, College of Pharmacy), Arpita K. Vyas (CNU, College of Medicine).



- **Session 2:** Federal and State Grants (March 9, 2020): Topics: finding appropriate funding mechanisms, writing a strong specific aims page Panel Members: Drs. Ghalib Alkhatib (CNU, College of Medicine), Yihui Shi (CNU, College of Medicine), Jason Lillis (CNU, College of Psychology), and Paul Glassman (CNU, College of Dentistry).
- **Session 3:** Student Grant Applications (TBA) Panel Members: Drs. Ashim Malhotra (CNU, College of Pharmacy) and Linda Buckley (CNU, College of Pharmacy).
- **Session 4:** Grant-Writing Tips and Tricks (TBA) Topics: writing a strong research strategy section (including statistical analysis section) Panel Members: Drs. Sonal Desai (Senior Grant Writer, UC Davis) and Craig Wetterer (CNU, College of Psychology).

Our future goals are to continue to support MPS faculty scholarly activities. We have committed to increasing funding for intramural grants, enhancing resource availability, and strategically

hiring faculty with strong research backgrounds and experience in securing extramural funding to fit with the research mission of CNUMPS.

c. Faculty Professional Development Opportunities on Teaching

Ongoing professional development opportunities specifically around teaching are multi-faceted and include:



1. Regular on-campus professional development lectures on topics including leadership; pedagogy; curriculum development and mapping; evaluation and assessment, and clinical, basic science, and translational research.
2. Faculty professional development workshops based on faculty-identified areas for opportunity/enhancement, and other focused pedagogical training series, as provided by the CNU Institute of Teaching and Learning Excellence (ITLE).
3. Seminars devoted to education have also included topics such as writing exam questions, pedagogy, engagement of student learning.

In addition to on-campus professional development, CNUMPS provides discretionary funds for faculty attendance at local and national conferences on pedagogy (Harvard Macy-Leading Innovation in Health Care and Education), assessment (including question-writing, WASC Annual Conferences and workshops), ITLE Grant-Writing Workshops and specialty/discipline-specific content as related to their teaching responsibilities.

d. Faculty workload

The MPS faculty workload is divided as follows: 35% teaching, 55% research and scholar activity, and 10% service. The teaching load includes direct face-to-face teaching and necessary adjustments have been made to account for preparation time required for each lecture, and



small group discussions. The service component includes administrative work performed as a member of faculty standing committees and other intramural and extramural activity necessary for personal professional growth.

Overall, this workload demonstrates an alignment with the missions of the MPS program. Annually, faculty reassess their efforts within each mission by completing the Individual Development Plan which is reviewed with the Dean to make necessary adjustments. Particular attention is paid to teaching and service burdens among faculty to allow for pursuits of scholarly activities or personal development. CNUMPS recognizes that a comprehensive workload analysis can be conducted on a regular basis to balance both institutional needs and faculty success.

11. MPS Community Service.

a. CNU Annual Summer Diversity Camp.

The MPS program is the main organizer and sponsor for the CNU Annual Diversity Summer Camp which aims to leverage and increase the awareness of health profession careers among minority high school students such as African American and LatinX students.

b. CNU COVID-19 Vaccination Clinic.

MPS students have received acknowledgement and appreciation from CNU President's Office for their great help and dedication during COVID-19 clinic. MPS students represented the backbone



of the vaccination clinic regarding the organization process including the checking in, orientation organization and clinic paperwork documentation.

III. Future goals and planning for improvement

1. Implement strategies that help improve student recruiting and enrollment.

- ***Establishment of matrix database of undergraduate colleges national wide.*** We created database of contact information for the undergraduate colleges in California and other states. An MPS flyer and program information were emailed to health professions student clubs and academic advisors.
- ***Promoting the CNUMPS program among different Post-bacc programs national wide.*** The CNUMPS program was included in the AAMC post-bacc dictionary database. In addition, a power-point presentation was delivered to multiple pre-med programs in Northern California.
- ***Participation in AAMC Annual Fair.*** MPS was represented in the AAMC Annual Fair.
- ***Promoting the MPS among the volunteers in CNU COVID-19 vaccination clinic.*** A database of contact information for all undergraduate volunteers in CNU vaccination COVID-19 clinic was created and the MPS program information was emailed to them.
- ***Rejection list of CNUCOM.*** Contact information was retrieved from the CNUCOM rejection list and MPS program information was emailed to these prospective candidates.
- ***GRE database.*** A database of contact information for thousands of prospective candidates was also created through ETS-GRE databased.



- ***Establishment of Monthly MPS Update Newsletter.*** A monthly MPS update newsletter was established through the MPS organization. This newsletter is sent monthly to recently accepted students to engage them in the MPS activity in attempt to reduce the enrollment melting rate.

2. Implement strategies that help improve faculty development and retention, to include strategies already identified at the University level.

- Regular adjustment of faculty workload, especially on teaching and service to make sure they have sufficient protected time for their scholarly activities and professional development.
- Implement a pay rise scale.
- Implement a more competitive benefits package with options for long-term care
- Implement and monitor a long-term mentoring program.
- Increase the use of multi-year contracts and timeliness of contract renewals.
- Increase the number of faculty development opportunities such as allocating Faculty Development Fund for each MPS faculty.
- Over the upcoming five years, we are planning to recruit two more faculty with high research profiles in the fields of oncology and vaccinology. Also, we are planning to hire an additional administrative assistant to have a total of two administrative assistants, hence each administrative assistant will be responsible for one of both MPS classes.



3. Establishing extramural funding. We aim to secure one NIH-R01 and one NIH-R21 grant over the upcoming five years. To achieve this, four main strategies put in place:

- Increase the internal and external collaboration.
- Increase the allocating funds for internal mini-grants from \$20,000 to \$40,000 to create more preliminary data as seed for NIH grant.
- Encourage the MPS faculty to be involved in the NIH reviewing study sessions to gain additional experience in the grant reviewing process. Indeed, Dr. Hongbin Wang was recently selected to be involved in the “Innate Immunity” study session of National Institute of Allergy and Infectious Diseases (NIAID).
- At the University level, an Office of Research has been established and a new director with extensive experience in handling federal and foundational grants was hired. This will significantly help to provide the CNU faculty with several funding opportunities. Also, the research office will help the faculty in reviewing their grant before submission.

4. Establishing summer internship program between CNUMPS program and several pharmaceutical companies in Northern California. The Northern California region is one of the major pharmaceutical industry hubs national wide. We will create strategies to build a network with several pharmaceutical companies. Ultimately, we would like to establish a six-week



summer internship programs with these companies in which selected MPS students will have the opportunity during the summer break between the first and second year to join one of these companies to get applicable experience in the field of the industrial pharmacy. Two main approaches will be taken to build bridges with several pharmaceutical companies:

- Establishing “*Annual Pharmaceutical Industry Fair*” sponsored by the CNUMPS program. Every year, we will invite numerous pharmaceutical companies in the Bay Area to an
- Annual Fair that will be held in the CNU Event Center in which each company will have a booth to present their vision and mission.
- Establishing “*Monthly Pharmaceutical Industry Seminar*”. With support from the office of the Dean, the outreach personal of MPS student organization will reach out to key personal in several pharmaceutical to visit the CNU campus and give a speech. This will be in monthly basis.