SCHOOL OF MEDICINE
CASE WESTERN RESERVE UNIVERSITY

Faculty Council Meeting
Meeting Minutes
Monday, February 13, 2023

Timing	Agenda Item	Presenter	Summary of discussion	Action items/Motions/ Votes
4:01-4:04PM	Welcome and Chair Announcements	Darin Croft	The Chair called the meeting to order at 4:01PM. Representatives should mention this to their department, and anyone interested in participating on the Awards and Honors Committee should reach out to Dr. Croft. The ad hoc Committee on Appointments, Promotions and Tenure is soliciting input from Faculty Council e.g. specific questions they would like answered. Representatives should bring this up at their department meetings. Danny Manor is our representative on the Shared Governance Committee (a university committee) which is looking at the shared governance taking place in the different schools and what some schools are doing well. Dr. Croft reminded the council that the Third Meeting of Faculty with Dean Gerson is scheduled for May 3 – 12:00-1:15PM. He asked the council to consider topics they would like to be addressed. For the first half of the meeting the Dean will discuss questions selected by Faculty Council; the second half will be an open forum.	
4:04-4:05PM	Approval of the February Faculty Council Minutes	Darin Croft	When polled, there were no corrections or additions to the January Faculty Council minutes.	The minutes are accepted as presented by unanimous consent.
4:05-4:08PM	Faculty Council Steering Committee Report of Activities	Matthias Buck	Dr. Buck presented a summary report of activities for the February 6 Faculty Council Steering Committee meeting. Dean Gerson was present at this meeting and updated the Steering Committee on the status of the interim chair for the Department of Neuroscience and the department's request to open a search for the chair. The Dean also stated that they are looking at the bylaws and putting forth some suggestions pertaining to criteria used to evaluate for promotion and tenure. Darin Croft has suggested some changes to the position of Vice Chair of Faculty (the same person as the Chair of Faculty Council). The Dean would like the Vice Chair of Faculty to be more engaged with standing committees and meet with the basic science chairs as well as with the Dean's council on a quarterly basis.	

			It was noted that documents stored on the Faculty Affairs website are systematically removed by IT after several years. Anastasia Rowland-Seymour brought to the committee's attention that the qualifications for distinguished university professor-ships exclude NTT faculty members. This will be discussed with the central university to see if the requirements could be widened.	Nicole Deming will determine if the mechanism used by the Faculty Senate to store documents would work for Faculty Council.
4:08-4:24PM	Faculty Senate Report	Alan Levine	Faculty Council had asked the Faculty Senate to look at the issue of tenure-track appointments at UH. The Personnel Committee and the Bylaws Committee examined this question and came back with the conclusion, which they shared with Faculty Senate, that the policy at University Hospitals was inconsistent with the definition of tenure in the CWRU Handbook. Dr. Levin passed on this information to Faculty Council as they requested. The President and Provost accepted the opinion of the Faculty Senate, Personnel Committee, and advice from the Bylaws Committee. They agreed that the idea of tenure is sacrosanct to all faculty and that the situation we are in now may be the result of the fact that faculty were not engaged in 2016. Both the President and the Provost want to engage the Senate and correct the oversight. The Faculty Senate stands with the SOM as do the President and the Provost. It was felt that the Senate could use their bully pulpit to move this situation forward. Their two concerns were the approximately 12 people who have already signed the side contract, and upcoming contracts for UH new recruits. The Senate is not just sending this back to Faculty Council but wishes to be actively involved	
4:24-4:27PM	New Aerospace Physiology Certificates	Tom Nosek	The Department of Physiology and Biophysics proposes two new 18 credit hour certificates in Aerospace Physiology, one in-person and one online. Dr. Nosek explained that the Air Force sets the standard for all government agencies associated with aerospace physiology. He and other representatives met with the head of Aerospace Physiology at the Pentagon in response to their request to see if CWRU could provide an 18 credit hour certificate (and later a master's program) for aerospace physiology. A PhD program already exists. This would be two formats, in-person and on-line.	

			The learning outcome of the Certificate in Aerospace Physiology program is to prepare students for careers in fields such as high-performance aviation and aerospace aviation or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities. At the end of this program, students should be ready to take and pass the Aerospace Medical Association (AsMA) Board Certification Examination in Aerospace Physiology and become a Board Certified Aerospace Physiologist.	A motion was made by a FC representative and seconded by a FC representative to end discussion. It was passed by unanimous consent. A motion was made by a FC representative and seconded by a FC representative to approve the Aerospace Physiology: Concentration. Vote: 42 were in favor, 2 were against, and 1 abstained. The motion is approved. A motion was made by a FC representative and seconded by a FC representative to approve the Aerospace Physiology: Online Delivery. Vote: 41 were in favor, 1 was against, and 0 abstained. The motion is approved.
4:27-4:51PM	Closure of UH Plastic Surgery Academic Department	Joseph Sabik	Dr. Sabik informed the members that due to lack of leadership and few faculty, they would like to close the UH Plastic Surgery Academic Department. The UH Department of Plastic Surgery is no longer a separate department, it is a division within the Department of Surgery. There is no DCAPT for Plastic Surgery, it is done though the DCAPT in General Surgery, and there are no faculty currently in the Plastic Surgery Department; all are in the Department of Surgery. It would not be that difficult to reopen this department, if decided to do so at a future time, since Plastic Surgery is a department that exists at two of our other sites (MHMC and CCF).	A motion was made by a FC representative and seconded by a FC representative to end discussion. When polled, there were no objections to ending discussion. A motion was made by a FC representative and seconded by a FC representative to approve the closure of the academic Department of Plastic Surgery at UH.

	Closure of UH Plastic Surgery Academic Department (continued)			Vote: 41 were in favor, 1 was against, and 5 abstained. The motion is approved.
4:51-PM	New Business		When polled for new business, Dean Gerson's recent memo regarding medical school ranking and the issue that many institutions have been opting out of US News & World Report was brought forward for discussion. It was noted that our data for this year's rating have already been submitted. When we are requested to participate in the fall, we may or may not pass along the information/opt out. The Dean stated that we are very comfortable with the quality of our students and output. He had anecdotal evidence that students do notappear to value the ranking, but was reminded that parents might.	
5:01PM	Adjourn		There being no additional items to be addressed, the Chair adjourned the meeting at 5:01PM.	

Present

Robert Aboussaly
Alicia Aguilar
Blaine (Todd) Bafus
Elvera L. Baron
Maura Berkelhamer
Neil Bruce
Matthias Buck
Aleece Caron
Mohamad Chaaban
Darin Croft
Margot Damaser
Jessica Fesler)
Stephen Fink
Stan Gerson
Rachael Gowen
Matthew Grabowski
Peter Harte
Alia Hdeib
Jessie Jean-Claude
Peter K. Kaiser
Hung -Ying Kao
Sadashiva Karnik
Erin Lamb
Kelly Lebak
Alan Levine
Lia Logio
Dan Ma
Tani Malhotra
Mariel Manlapaz
Danny Manor
Christopher McFarland
William Merrick
Sam Mesiano
David Mihal
Dean Nakamoto
Arne Rietsch
Anastasia Rowland-Seymour
Elie Anthony Saade
Tamer Said
Linda Dalal Shiber
Bryan Singelyn
Phoebe Stewart
Usha Stiefel
James (Jim) Strainic
Nami Tajima
Daniel Tisch
Johannes von Lintig
Mark Walker
Robert Wetzel
Wei Xiong
Raed Zuhour

Not Present

Moises Auron
Corinne Bazella
Dan Cai
Bryan Carroll
Piet de Boer
Patrick Collier
Andrew Crofton
Meelie DebRoy
David DiLorenzo
Katherine DiSano
Jonathan Emery
Corinna Falck-Ytter
Robert Geertman
Bahar Bassiri Gharb
Ramy Ghayda
Amy Hise
Andrew Jones
Eric W. Kaler
Gaby Khoury
Vijaya Kosaraju
Sangeeta Krishna
Mallika Lavakumar
Shawn Li
David Ludlow
Raman Marwaha
Daniela Mehech
Nathan Mesko
Gillian Michaelson
Rocio Moran
Attila Nemeth
Cyrus Rabbani
Jacek Skowronski
Courtney Smalley
Ben Strowbridge
Joseph Tagliaferro
Patricia Taylor
Sarah Tehranisa
Leon R. White
Sherry Yu
Samina Yunus
Johannes von Lintig
Ari Wachsman

Others Present

Abigail Basson
Nicole Deming
Joyce Helton
Cynthia Kim
Cynthia Kubu
Tom Nosek
Joseph Sabik

Today's agenda

1. Chair's Announcements (Darin Croft)
2. Approval of January Faculty Council minutes (Darin Croft)
3. Steering Committee report (Matthias Buck)
4. Faculty Senate report (Alan Levine)
5. New Aerospace Physiology certificates (Tom Nosek)
6. Closure of UH Plastic Surgery academic department (Joseph Sabik)
7. New Business

Committee members needed

- We need faculty members to serve on a *new* SOM ad hoc committee: the **Awards and Honors Committee**
  - The committee will help identify CWRU candidates for awards (see PDF in Box for full description)
- Any faculty member is eligible to serve
  - We would like at least one representative of each campus

Please step forward or nominate a colleague!

Case Western Reserve University School of Medicine
University Hospitals
Cleveland Clinic
Metro Health
VA U.S. Department of Veterans Affairs

Appointment, Promotion, and Tenure

- Dean Gerson has established an Ad Hoc Committee on Appointments, Promotion, and Award of Tenure
- Review the PDF in Box for: (1) the committee's charge; and (2) topics/questions on which the chairs would like feedback from faculty
  - Please distribute the PDF to your faculty and solicit feedback
  - We will discuss at the March Faculty Council meeting

School of Medicine Elections

In May, we will elect faculty to many positions:

- Standing committees of the Faculty of Medicine
- Nominations and Elections Committee
- At-large members of Faculty Council

*** Please encourage members of your department to run ***

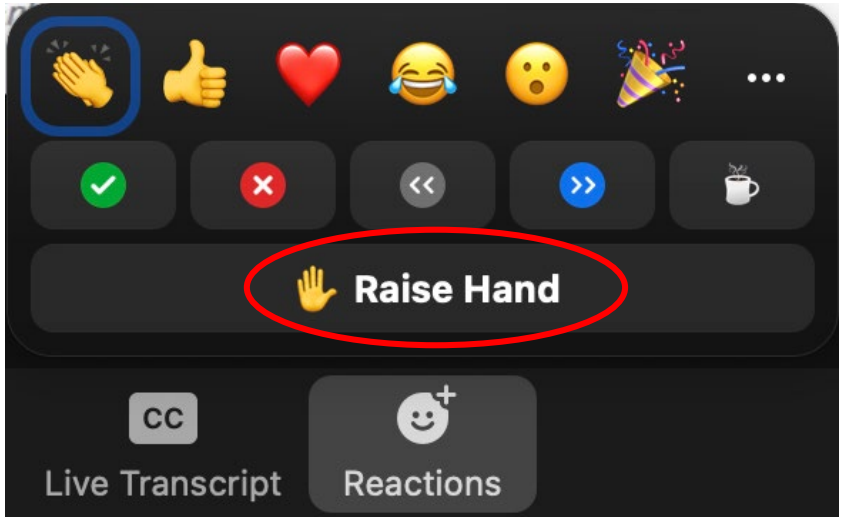
Contact Scott Howard (n.scott.howard@uhhospitals.org) or Nicole Deming (nmd11@case.edu) with questions or nominations

Third Meeting of the Faculty of Medicine (with Dean Gerson)

- Save the date: Wednesday, May 3rd, 12:00-1:30 pm
  - In-person and Zoom, location TBD
- What topics would you like Dean Gerson to address?
- Send suggestions to Darin Croft (dac34@case.edu) and Nicole Deming (nmd11@case.edu)

Have something to say?

- Raise your hand (Reactions menu) (and lower when done)
- Wait to be acknowledged
- Be clear and to the point
- Please do not have side conversations in Chat



Agenda items for March FC meeting

- Must be submitted by Feb 24th (*next Friday*)
  - Send to Darin Croft (dac34@case.edu) and Nicole Deming (nmd11@case.edu)
- Will be considered by the Steering Committee on Monday, March 6th (3:30-5:00 pm)
  - Set this day/time aside for possible presentation (Zoom)
- Feel free to plan ahead and send requests for April!

Faculty Council's Ad Hoc Committee on Awards and Honors

Approved by Faculty Council 9-23-2019; Revised by Faculty Council 1-27-2020

Regionally, nationally and internationally a large number of groundbreaking and discipline-specific honors and awards are given to individuals who advance various biomedical fields, be it in research, service or teaching. Identification of opportunities and crafting of materials describing these extraordinary accomplishments is left to individual faculty, who may be unaware that they can and should apply for honors and awards, or may not be experienced in crafting materials. Many organizations send repeated requests for awards and honors applications because an insufficient number of individuals submit materials, or the applications received are not judged worthy because they are poorly constructed, not necessarily because they are not meritorious; junior faculty particularly underestimate the value of their work. This committee is created to increase the number of faculty who are nominated to awards and honors nationally and internationally. The Nominations and Elections Committee will review nominees and create a ballot for the Faculty Council to vote and elect the committee members. This committee will work hand-in-hand with Chairs of Departments and Centers to identify opportunities for CWRU faculty to be nominated to various awards/honors.

Purpose:

1. To identify new and existing opportunities for faculty at every rank, and increase the number of faculty members at CWRU-SOM who receive awards/honors
2. To create a nomination process and assist faculty in determining if and when they should apply for various honors/awards
3. To recommend procedures for crafting materials including producing templates for some very important awards/honors

Committee Member role:

1. Develop a searchable listing of honors and awards, eligibility, frequency, deadlines (to the extent possible)
2. Solicit nominations in conjunction with Department and Center Chairs
3. Review materials submitted and suggest edits based on description of the opportunity or general knowledge of the field
4. Create a databank of materials for faculty to utilize as samples
5. Create an annual honor roll to submit to the Dean/Provost/President

Membership and size of the committee:

1. 4-6 members at different career stages from across the SOM; no more than one member from any department or center to have the broadest representation.
2. Chair should be at least Associate Professor or above with general knowledge of meritorious awards/honors such as the Nobel Prize, National Academies, AAAS Fellows program, and at least one discipline-specific award/honor
3. Members will serve a 3-year term.

4. Members will include both Faculty Council members and individuals not on Faculty Council.

Time Commitment and Resources:

1. The first year will probably be the most intense as uniform procedures and guides do not exist, and the committee may need to meet monthly to advance the agenda. Once a regular agenda is established quarterly meetings (or less, if work can be done online, or via Zoom) may suffice.

2. IT support will be requested to develop the database and centralize materials.

Ad Hoc Committee on Appointments, Promotion, and Award of Tenure

Dean Gerson has established an ad hoc School of Medicine Committee on Appointments, Promotion, and Award of Tenure with the following charge:

1. Ensure that practices across five campuses remain compliant with the Faculty Handbook and SOM Bylaws and are sufficient to capture and promote faculty activities;
2. Provide recommendations on distinguishing and more explicitly defining the criteria for promotion versus the award of tenure with careful attention to the diversity of SOM faculty and their accomplishments in academic medicine; and
3. Make recommendations on the sufficiency of the current standards, opportunities for improved processes, and offer guidance on considering information submitted in the two optional statements: 1) the COVID impact statement, and 2) the diversity statement.

The faculty co-chairs of the ad hoc committee are seeking input from the Faculty Council during the spring semester. Some questions they are asking other faculty constituencies and SOM/university leaders include:

1. What does it mean to be an academic and have a university appointment (remembering that many SOM faculty and many of our committee members are located at our clinical affiliates and may have less strong ties to the central university)
2. What do you see as overarching themes/trends in promotion and tenure that might impact the CWRU process in years to come?
3. What is your understanding regarding new requirements from the Provost's office for the COVID impact statement and Diversity statement?

Co-chairs:

Rosa K Hand, PhD, RDN, LD, FAND
Assistant Professor, Department of Nutrition
CWRU Director, Combined Dietetic Internship/Master's Degree Program
rosa.hand@case.edu

Cathy Carlin, PhD
Professor, Department of Molecular Biology and Microbiology
cathleen.carlin@case.edu

SCHOOL OF MEDICINE
CASE WESTERN RESERVE UNIVERSITY

Faculty Council Meeting
Draft Meeting Minutes
Monday, January 23, 2023
4:00-5:30PM

Timing	Agenda Item	Presenter	Summary of discussion	Action items/Motions/ Votes
4:01-4:04PM	Welcome and Chair Announcements	Darin Croft	The Chair called the meeting to order at 4:01PM. The Dean's Third Meeting of Faculty is scheduled for May 3, from Noon to 0 1:00PM via Zoom. The Chair is soliciting topics for the Dean to address. It is customary for the first half of the meeting to address three topics provided by Faculty Council, while the second half is reserved for questions.	
4:04-4:05PM	Approval of December Faculty Council Minutes	Darin Croft	When polled, there were no corrections or additions to the December Faculty Council minutes.	The minutes are accepted as presented by unanimous consent.
4:05-4:08PM	Faculty Council Steering Committee Report of Activities	Matthias Buck	Dr. Buck presented a summary report of activities for the January 9 Faculty Council Steering Committee meeting.	
4:08-4:18PM	Committee on Medical Education	Corinne Bazella	Dr. Bazella presented the Committee on Medical Education's annual report to Faculty Council. CME is responsible for policy oversight, broad planning issues, review, and overall evaluation of the curriculum of the SOM. Meetings are open to the faculty and occur on the 4th Thursday of the month via Zoom from 4:00-5:50PM. She provided an overview of the new initiative curriculum structure explaining that the changes decrease the time for step 1 and increase the time for step 2, giving students more time to explore career choices. The CME is in the process of preparing for the 2024-2025 LCME site visit. The LCME CQI Dashboard Model was revised and approved. The CQI Committee was created as a subcommittee of CME to evaluate LCME standards and to refer non-compliance to CME and evaluated for further review. The pilot Independent Student Analysis for LCME was presented and evaluated. A task force was created to evaluate our grading system in the 3rd year clerkships and how student clinical performance and shelf exam scores are weighed in the grading.	

	Committee on Medical Education (continued)		The committee charge is being updated and modified and will be presented to the Bylaws Committee and the Faculty Council Steering Committee for review.	
4:18-4:27PM	Faculty Senate Report	Alan Levine	Dr. Levine informed the members that the Honorary Degree Candidate has been chosen and will be announced at commencement. There has been a large effort by the Provost's office to rekindle the CWRU Cleveland College, which will offer faculty outside and inside the opportunity to teach. Many universities do this already and it will be a financial boon to the university. The Executive Committee has expressed interest in hearing the details and it will be presented to them sometime in the fall. In June of last year, Faculty Council requested that the Faculty Senate look into information they received that University Hospital had a program in which approximately 12 tenure or tenure-track faculty members were asked to sign a contract with a five-year review. If their performance is found to be less than acceptable, their contract will not be renewed, and the side letter they were asked to sign requires them to resign from their tenured appointment at CWRU. The Faculty Senate charged the Personnel Committee, in consultation with the Bylaws Committee, to review whatever documentation was available from UH. This material is very confidential and not available to general faculty. The Personnel Committee took two months to review the 2016 agreement between Case and UH, and the bylaws and constitution for the university, to determine what tenure means and was UH policy consistent with university policy. The Personnel and Bylaws Committees came to the conclusion that the current UH practice is not compatible with CWRU's tenure definition. After unanimous approval from the Executive Committee, this topic was added to the Faculty Senate agenda for January 30.	Dr, Levine will bring this up at the next Faculty Senate Meeting and report back at the February Faculty Council Meeting.
4:27-4:51PM	Basic Science Faculty Salary Review	Jonathan Haines	Dr. Haines explained that CBSC Faculty Salary Review was prepared at the request of the basic science chairs of the SOM who wished to have a better idea of what salaries look like and how they are structured for 100% CWRU paid faculty. These slides have been uploaded to the Faculty Council folder on BOX for members to review. Due to the confidential nature of this information, details will not be provided in the meeting minutes.	

4:51-5:08PM	SOM Data from CWRU Climate Survey	Elizabeth Fehsenfeld	Dr. Fehsenveld, Chief of Staff in the SOM, provided an overview of the data collected from the CWRU Employee Engagement Survey 2022. The SOM number of responses to the survey ranked higher than other schools across the university. The Faculty Senate plans to survey all faculty across the university.	
5:08-5:24PM	Updated DEI Strategic Plan and Grievance Management System Reporting Portal	Tina Lining	Tina Lining, Director of Diversity, Equity and Inclusive Excellence, informed the members that the DEI ad hoc Committee has created a Strategic Diversity Plan outlining four objectives to assist in achieving their goals. She explained that the Grievance Management System has a new care portal through Symplicity which will facilitate the reporting process. Currently 90-minute information meetings are being held to configure our system to fit SOM. Symplicity utilizes "Train the Trainer" methods to implement their products. Dean Gerson plans to send out a message to the SOM and other campuses this month introducing the portal. Introductory presentation to departments will be scheduled. The pilot launch phase is April 2023, with the full launch July M1Orientation and again in August.	
5:24-5:25PM	New Business		When polled, no new business topics were indicated.	
5:25PM	Adjourn		The Chair adjourned the meeting at 5:25PM.	

Present

Robert Abouassaly
Alicia Aguilar
Moises Auron
Blaine (Todd) Bafus
Neil Bruce
Matthias Buck
Aleece Caron
Mohamad Chaaban
Darin Croft
Margot Damaser
Jonathan Emery
Ramy Ghayda
Rachael Gowen
Matthew Grabowski
Alia Hdeib
Jessie Jean-Claude
Andrew Jones
Peter K. Kaiser
Gaby Khoury
Erin Lamb
Kelly Lebak
Alan Levine
Lia Logio
Dan Ma
Tani Malhotra
Mariel Manlapaz
Danny Manor
Christopher McFarland
Sam Mesiano
David Mihal
Dean Nakamoto
Attila Nemeth
Arne Rietsch
Anastasia Rowland-Seymour
Elie Anthony Saade
Linda Dalal Shiber
Bryan Singelyn
Phoebe Stewart
Usha Stiefel
James (Jim) Strainic
Ben Strowbridge
Joseph Tagliaferro
Nami Tajima
Sarah Tehranisa
Daniel Tisch
Johannes von Lintig
Mark Walker
Robert Wetzel
Leon R. White
Wei Xiong
Samina Yunus
Raed Zuhour

Not Present

Elvera L. Baron
Corinne Bazella
Maura Berkelhamer
Dan Cai
Bryan Carroll
Patrick Collier
Andrew Crofton
Piet de Boer
Meelie DebRoy
David DiLorenzo
Katherine DiSano
Corinna Falck-Ytter
Jessica Fesler
Stephen Fink
Robert Geertman
Stan Gerson
Jessica Fesler
Bahar Bassiri Gharb
Peter Harte
Amy Hise
Eric W. Kaler
Hung-Ying Kao
Sadashiva Karnik
Vijaya Kosaraju
Sangeeta Krishna
Mallika Lavakumar
Shawn Li
David Ludlow
Raman Marwaha
Daniela Mehech
William Merrick
Nathan Mesko
Gillian Michaelson
Rocio Moran
Cyrus Rabbani
Tamer Said
Jacek Skowronski
Courtney Smalley
Patricia Taylor
Ari Wachsman
Sherry Yu

Others Present

Nicole Deming
Joyce Helton
Elizabeth Fehsenfeld
Jonathan Haines
Cynthia Kim
Sadu Karnik
Cynthia Kubu
Tina Lining
Susan Wang

Revised December 15, 2022

Aerospace Physiology, Graduate Certificate
Department of Physiology and Biophysics

1. **Designation of the new graduate program, with a brief description of its intellectual rationale and purpose.**

The Department of Physiology and Biophysics proposes a new 18 credit-hour **Certificate in Aerospace Physiology program.**

Definition of Aerospace Physiology
Aerospace Physiology (AP) is the study of the physical and cognitive impact of an extreme and/or austere environment upon an individual. The purpose of this Certificate program is to provide the foundation to develop strategies conferring mental and physical resilience against extreme environmental conditions, thereby optimizing performance of the aerospace traveler.

The commercial (civilian) space tourism industries, as well as the rapidly expanding federal and military aero- and space initiatives (well represented in Ohio) are hampered by an absence of scientists, physicians, educators and physiologists with first-hand experience of high-performance aviation. There is especially a dearth of physicians and scientists who have experienced both the physical challenges of aerospace aviation (hyper- and hypo- gravity, supersonic speeds, etc.) as well as subsequent outcomes. This creates a significant void in trained personnel; a void that we in the Department of Physiology & Biophysics are uniquely poised to fill. There is no similar program offered by any other department at CWRU. The proposed program is fostered by the Center for Aerospace Physiology that resides in the Department of Physiology and Biophysics. We know of only one other Certificate in Aerospace Physiology program in the state of Ohio. This program is at Wright State University. It is a Preventive Medicine Specialty designed for practicing physicians.

2. **Description of proposed curriculum.**

Objective of the Aerospace Physiology Program

The learning outcome of the Certificate in Aerospace Physiology program is to prepare students for careers in the fields listed above or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities. At the end of this program, students should be ready to take and pass the Aerospace Medical Association (AsMA) Board Certification Examination in Aerospace Physiology and become a Board Certified Aerospace Physiologist. In this examination, students must demonstrate competency in the characteristics of the atmosphere, acceleration, spatial disorientation, and the physiology of decompression, thermos-regulation, hyperbarics, respiration, and cardiovascular function. Additional competencies in operational topics such as positive pressure breathing, noise, and LASER radiation must also be demonstrated.

Program Description:

The Certificate in Aerospace Physiology is available to students who have already earned a bachelor's degree in a physical or biological science. All courses (including the Aerospace Physiology Journal Club) are offered in a traditional, synchronous, lecture/small group format. The one exception to this is the 3-credit hour required "Laboratory Research Rotation: Aerospace Physiology" course taught by Drs. Michael Decker, Lisa Damato, and Kingman Strohl (PHOL 423). This course has an intense 4-day laboratory component.

Application Process for the Certificate in AP program:
By July 15th of each year, applicants wishing to start the program in the Fall of that year should complete the online application: https://applygrad.case.edu/apply/

The Aerospace Physiology Administration Committee will evaluate the applications and notify the applicants of their decision within two weeks of receiving them. Successful applicants will have a sound background in human anatomy and physiology as evidenced by successful completion (typically with a final GPA greater than 3.0) of:

1. A formal degree program in one of the following:
    a. Allied Health Sciences (e.g. nursing, respiratory therapy, physical therapy);
    b. Exercise or sports physiology;
    c. Biology with additional coursework in human anatomy and physiology.
2. An undergraduate degree (unspecified major) with additional formal coursework in Human Anatomy, Human Physiology, Biochemistry, and Physics.

Applicants should provide at least two letters of recommendation that support their interest in AP and their aptitude for advanced graduate study in the field.

Applicants must provide a Personal Statement that demonstrates their interest in the field and outlines how obtaining the Certificate in Aerospace Physiology will advance their career goals.

No standardized exam (such as the GRE) is required.

Students currently in the MS in Medical Physiology program in the Department of Physiology and Biophysics can apply to the Certificate program after successfully completing their first year in the MSMP program, having earned a GPA greater than 3.0, having passed the Comprehensive Exam, and having received a favorable recommendation from their MSMP Faculty Advisor. They can earn the Certificate in AP along with their MSMP degree at the end of their second year in the MSMP program. Students from other departments in the School of Medicine and other Schools at CWRU (ex. Aerospace Engineering students, MD students, Nursing students, Physician Assistant students, Biology students, etc.) with a particular interest in Aerospace Physiology are encouraged and welcomed to apply for the Certificate in AP program. The exact curriculum that these students will follow to satisfy the requirements for the Certificate in AP will be individually developed with the Director of the Certificate in AP program and the student's Faculty Advisor in their primary department.

Upon acceptance into the program, each student is assigned an Aerospace Physiology Faculty Advisor.

In order to earn the Certificate in Aerospace Physiology, students must demonstrate depth and breadth of knowledge of human physiology and cognitive responses during exposure to extreme environments, as well as a proficiency in implementing strategies that confer resilience and optimal human performance in those environments. The graduate will also be familiar with technologies used by aerospace physiologists in training and monitoring persons working and living within aerospace environments. Graduates will demonstrate these proficiencies by:

1. Completing the 18 credits of course work detailed below;
2. Being an active participant in the Aerospace Journal Club every Fall and Spring semester they are registered for courses;
3. Have a final GPA GREATER than 3.0.

Learning Objectives are provided for each lecture with exam questions testing for competency over these Learning Objectives. The Learning Objectives for course are aligned with the Learning Objectives for the Board Certification exam administered by the Aerospace Physiology Society (AsPS) (CAsP | Aerospace Physiology Society).

Curriculum: Certificate in Aerospace Physiology Program

It is recommended that full-time students follow the course schedule below:

Fall Semester (9 credit hours)
- *Introduction to AP I (PHOL 421) – 3 credit hours (Drs. Decker and Strohl)
- *Exercise Physiology in Health and Disease (PHOL 487) – 3 credit hours (Dr. Jessica Taylor)
- *Sleep Physiology (PHOL 614) – 3 credit hours (Dr. Decker)
- **Aerospace Journal Club – 0 Credit hours (Dr. Jessica Taylor)

Spring Semester (9 credit hours)
- *Introduction to AP II (PHOL 422) – 3 credit hours (Drs. Decker and Strohl)
- *Laboratory Research Rotation: Aerospace Physiology (PHOL 423) - 3 credit hours (Drs. Decker, Damato and Strohl) **4-Day laboratory requirement**
- **Aerospace Journal Club (Dr. Jessica Taylor) – 0 credit hours
- Choose one, 3 credit course from the following:
  - *Oxygen Physiology (PHOL 410) – 3 credit hours (Dr. Joe LaManna)
  - *Comparative and Evolutionary Physiology (PHOL 485) – 3 credit hours (Dr. Joe LaManna)
  - *Clinical Reasoning II (PHOL 492) – 3 credit hours (Dr. Andrea Romani)
  - *Independent Study in Physiology (PHOL 451) – 3 credit hours (AP Advisor)
  - *Research in Physiology (PHOL 601) – 3 credit hours (Faculty in the Center for Aerospace Physiology)

* An existing course taught in the Department of Physiology and Biophysics

** This course will be submitted to the Graduate School via the Online Course Action Form for approval.

All students in the Certificate in Aerospace Physiology Program will actively participate in the Aerospace Physiology Journal Club each Fall and Spring semester that they are registered for classes. Students will present recent papers that are seminal for the understanding of Aerospace Physiology. Papers will be chosen by the Director of the Journal Club, Dr. Jessica Taylor. All students are expected to have read the papers and be prepared to discuss them at the meeting of the Journal Club. The Journal Club will meet 5 times fall semester (twice in September and October and once in November) and 5 times spring semester (twice in February and March and once in April). This Journal Club was initiated Fall Semester 2022 for interested students in the MSMP program.

Because a large percentage of the students interested in this program will be working either full or part time, the program can be very flexibly scheduled with the following considerations:

1. Every student must participate in the Aerospace Journal Club every Fall and Spring semesters for which they are registered for a course in the program.
2. During summer semester, taking 3 credit hours of courses makes a student a full time student and eligible for financial Aid. During the Fall and Spring semesters, students must register for at least 4.5 credit hours of courses to be eligible for financial aid.
3. All Certificate in AP students must begin the program Fall semester.
4. Students may take this program part-time (not following the full time scheduled detailed above). However, every student **MUST AT LEAST** take Introduction to Aerospace Physiology I their first Fall semester in the program and Introduction to Aerospace Physiology II their first Spring semester in the program. The remaining course requirements detailed above for full-time students can be completed on a schedule established by the student and his/her Aerospace Physiology Advisor. As few as 1 course/semester can be taken to keep a student in good standing. Once starting the program, a student must request a Leave of Absence from the Graduate School if they do not register for at least one course Fall or Spring semesters. Students are not required to take courses during Summer semester.

3. Administrative arrangements for program and academic units involved.

The Certificate in Aerospace Physiology program will be totally administered within the Department of Physiology and Biophysics.

Dr. Walter F. Boron is the Chair of the Department of Physiology and Biophysics. He has named Dr. Thomas M. Nosek, Professor Emeritus, as the Director of the Certificate program. He has established an Aerospace Physiology Administration Committee (APAC) and charged it with the responsibility of designing and administering the Certificate in AP program.
Members of the committee are:

1. Dr. Thomas M. Nosek, Chair
2. Dr. Michael Decker
3. Dr. Lisa Damato
4. Dr. Joe LaManna
5. Dr. Corey Smith
6. Dr. Jessica Taylor

7. Dr. Kingman Strohl

4. Evidence of need.

The rapidly emerging aerospace and space tourism industry is enabling "tourists" to travel to suborbital locations, the International Space Station, and potentially, the "Artemis" Moon base, Mars and beyond. Sponsors of those projects range from government agencies such as NASA, the FAA and the European Space agency, to private industries which include Virgin Galactic, Space-X, to the US Space Force, Air Force, Navy and Marines.

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Dr. Decker and Dr. Damato have conducted 9 focus groups (detailed below) with stakeholders in the field of Aerospace Science. The unanimous opinion of these focus groups is that there is an ever increasing need for a program to train current Aerospace Science workers in the field of Aerospace Physiology.

Stakeholders/Career Opportunities

- Physician Careers
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  - Aerospace Medicine Specialist Physician (Air National Guard, USAF, USN, NASA)
- Research Physiologist Careers
  - NASA Human Research Program
  - Navy Research Physiologist
- Department of Transportation--Federal Aviation Administration
  - Medical Examiner
  - Aerospace & Environmental Physiology research team
- Commercial space companies
  - Virgin Galactic Research coordinator
  - SpaceX—medical support
- Aerospace Operational Physiologist (USAF, USN)

5. Prospective enrollment.

There is no upper limit to the number of students we can accommodated in the Certificate in AP Program. We anticipate that in the first year of the program, we will accept approximately 30 students. After the first year, focus groups conducted by Dr. Michael Decker suggest that this

number will exceed 100 acceptances each year. We expect that very few of the students will be full-time students, completing the program in one academic year. The majority we expect will be part time students over a 2-3-year period (one, 3-credit course/semester).

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The Department of Physiology and Biophysics has a strong research and teaching base in Aerospace Physiology. Five of our primary and secondary departmental faculty in the CWRU Center for Aerospace Physiology (Dr. Michael Decker – Director, Dr. Lisa Damato, Dr. Joe LaManna, Dr. Kingman Strohl, and Dr. Kui Xu.)

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8. **Projected financial needs to support program and adequacy of expected financial support.**

Financial support for this program will come from the tuition sharing arrangement among the University, School of Medicine, and Department of Physiology and Biophysics. In the past, this resource has been adequate to provide financial support for the MS in Medical Physiology program and we will assume that the additional student enrollment in the Certificate in Aerospace Physiology program will also be adequate to meet its needs. Specifically, the new expenses associated with the program include:

1. Hiring a senior Aerospace Physiologist to serve as Director of the program. Anticipated salary would be approximately $150,000.
2. Hiring at least 1 Teaching Assistant for the 3 new courses that will be created for the Certificate Program and at least 1 Teaching Assistant to help administer the program. Each Teaching Assistant is paid $10/hr for an average of 15 hrs/week for 45 weeks = $6,750/Teaching Assistant = $27,000 total program need for Teaching Assistants.
3. Total additional costs of the Certificate program to the Department = approximately $177,000/academic year.

Total anticipated minimal income expected from tuition sharing:

1. Expecting a minimum of 30 students in the program for the first year of the program. Taking 3 credit hours/semester, we assume students will take 2 years to complete the 18 credit-hour program.
2. Each student takes 3, 3 credit hour/academic year = 9 credit hours/academic year
3. At $2,100/credit hour, total anticipated tuition = $18,900/student/academic year. With 55% of the tuition returned to the program, this will provide the Department with $10,175/student/academic year.
4. With 30 students starting the first year of the program in 2023, we anticipate a total income to the Department to be $305,250. Only 18 students in the first year class will cover the extra financial needs of the program which = $177,000/academic year.
5. In the second and subsequent years of the program, we anticipate having at least 50 incoming students in the program. Thus, in the second year of the program, we anticipate having a total enrollment of 80 students with an income to the department of $814,000). In subsequent years when there are approximately 50 incoming students and 50 second year students, the minimal anticipated total income to the Department will = $1,017,500/year.

Thus the Certificate in Aerospace Physiology program will be financially self-sustaining if at least 9 students enroll each year.

9. Copies of reports from consultants or advisory committees used in the planning process.

Dr. Decker and Dr. Damato have met with 9 different groups of Aerospace Scientists:

1. May 14-19, 2021: Vance AFB (with A. Turner)

   Met with CRAFT team

   Met with aerospace physiologist (Patricia "Hammer")

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Met with CRAFT team (Brandi)

9. September 13-14,2021: Ryan Mayes, Brutus, Ron Riegle, Amanda Zehring visit CWRU

   This meeting was largely about research collaborations. Met with Dr. Walter Boron to discuss the potential for developing a Certificate and Master's programs in Aerospace Physiology within the Department.

Conclusions from these planning sessions:

The proximity of CWRU to the NASA Glenn Research Center and Wright Patterson Air Force Base is a strong advantage for the University developing Aerospace Physiology graduate programs. Also, the fact that Ohio is the #1 supplier to Boeing and Airbus, #7 in the US for Aerospace Defense jobs, and #2 in Aerospace Attractiveness will make our programs attractive to Aerospace industries in Ohio.

Presently, the Certificate, Master's, and Ph.D. programs in "Human Factors" at the Embry-Riddle Aeronautical University in Daytona Beach, Florida, are the "go to" graduate programs for the Air Force. However, they are dissatisfied with these programs because they do not have a strong Physiology component. Also, the military services would like to be associated with an established research university which Embry-Riddle is not.

The current MS in Medical Physiology program at CWRU has too large a physiology component to satisfy the needs of the military services.

The focus groups expressed the need for a program (or programs) which contains courses along the lines of:

1. Two, 3 credit hour courses in Human Physiology as it relates to Aerospace
2. An Exercise/Sports Physiology course
3. A Sleep Physiology course
4. A Nutrition course
5. A Human Factors/Organizational Factors/Psychology course
6. A Human Factors/Systems Integration/Cognitive Science course
7. A Decision Making course
8. An Aerospace Forensics/Critical Reasoning/Pathology course
9. An Aerospace Laboratory Science course

10. Letter of support from dean or other director of the appropriate university cost center.

Two letters are appended, one from Dr. Walter Boron, Chair of the Department of Physiology and Biophysics and the second from Dr. Stanton Gerson, Dean of the Case Western Reserve School of Medicine.

Revised December 15, 2022

Aerospace Physiology, Graduate Certificate (Online)
Department of Physiology and Biophysics

1. **Designation of the new graduate program, with a brief description of its intellectual rationale and purpose.**

The Department of Physiology and Biophysics proposes a new 18 credit-hour **Certificate in Aerospace Physiology (Online) program.**

Definition of Aerospace Physiology
Aerospace Physiology (AP) is the study of the physical and cognitive impact of an extreme and/or austere environment upon an individual. The purpose of this Certificate program is to provide the foundation to develop strategies conferring mental and physical resilience against extreme environmental conditions, thereby optimizing performance of the aerospace traveler.

The commercial (civilian) space tourism industries, as well as the rapidly expanding federal and military aero- and space initiatives (well represented in Ohio) are hampered by an absence of scientists, physicians, educators and physiologists with first-hand experience of high-performance aviation. There is especially a dearth of physicians and scientists who have experienced both the physical challenges of aerospace aviation (hyper- and hypo- gravity, supersonic speeds, etc.) as well as subsequent outcomes. This creates a significant void in trained personnel; a void that we in the Department of Physiology & Biophysics are uniquely poised to fill. There is no similar program offered by any other department at CWRU. The proposed program is fostered by the Center for Aerospace Physiology that resides in the Department of Physiology and Biophysics. We know of only one other Certificate in Aerospace Physiology program in the state of Ohio. This program is at Wright State University. It is a Preventive Medicine Specialty designed for practicing physicians.

2. **Description of proposed curriculum.**

Objective of the Aerospace Physiology Program

The learning outcome of the Certificate in Aerospace Physiology program is to prepare students for careers in the fields listed above or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities. At the end of this program, students should be ready to take and pass the Aerospace Medical Association (AsMA) Board Certification Examination in Aerospace Physiology and become a Board Certified Aerospace Physiologist. In this examination, students must demonstrate competency in the characteristics of the atmosphere, acceleration, spatial disorientation, and the physiology of decompression, thermos-regulation, hyperbarics, respiration, and cardiovascular function. Additional competencies in operational topics such as positive pressure breathing, noise, and LASER radiation must also be demonstrated.

Program Description:

The Certificate in Aerospace Physiology (Online) is available to students who have already earned a bachelor's degree in a physical or biological science. All courses (including the Aerospace Physiology Journal Club) are offered in a synchronous, lecture/small group format that are both live broadcast and asynchronously accessed from recordings over the Internet. The one exception to this is the 4-day residency requirement for the 3-credit hour required "Laboratory Research Rotation: Aerospace Physiology" course taught by Drs. Michael Decker, Lisa Damato, and Kingman Strohl (PHOL 423).

Application Process for the Certificate in AP program:
By July 15th of each year, applicants wishing to start the program in the Fall of that year should complete the online application: https://applygrad.case.edu/apply/

The Aerospace Physiology Administration Committee will evaluate the applications and notify the applicants of their decision within two weeks of receiving them. Successful applicants will have a sound background in human anatomy and physiology as evidenced by successful completion (typically with a final GPA greater than 3.0) of:

1. A formal degree program in one of the following:
    a. Allied Health Sciences (e.g. nursing, respiratory therapy, physical therapy);
    b. Exercise or sports physiology;
    c. Biology with additional coursework in human anatomy and physiology.
2. An undergraduate degree (unspecified major) with additional formal coursework in Human Anatomy, Human Physiology, Biochemistry, and Physics.

Applicants should provide at least two letters of recommendation that support their interest in AP and their aptitude for advanced graduate study in the field.

Applicants must provide a Personal Statement that demonstrates their interest in the field and outlines how obtaining the Certificate in Aerospace Physiology will advance their career goals.

No standardized exam (such as the GRE) is required.

Students currently in the MS in Medical Physiology program in the Department of Physiology and Biophysics can apply to the Certificate program after successfully completing their first year in the MSMP program, having earned a GPA greater than 3.0, having passed the Comprehensive Exam, and having received a favorable recommendation from their MSMP Faculty Advisor. They can earn the Certificate in AP along with their MSMP degree at the end of their second year in the MSMP program. Students from other departments in the School of Medicine and other Schools at CWRU (ex. Aerospace Engineering students, MD students, Nursing students, Physician Assistant students, Biology students, etc.) with a particular interest in Aerospace Physiology are encouraged and welcomed to apply for the Certificate in AP program. The exact curriculum that these students will follow to satisfy the requirements for the Certificate in AP will be individually developed with the Director of the Certificate in AP program and the student's Faculty Advisor in their primary department.

Upon acceptance into the program, each student is assigned an Aerospace Physiology Faculty Advisor.

In order to earn the Certificate in Aerospace Physiology, students must demonstrate depth and breadth of knowledge of human physiology and cognitive responses during exposure to extreme environments, as well as a proficiency in implementing strategies that confer resilience and optimal human performance in those environments. The graduate will also be familiar with technologies used by aerospace physiologists in training and monitoring persons working and living within aerospace environments. Graduates will demonstrate these proficiencies by:

1. Completing the 18 credits of course work detailed below;
2. Being an active participant in the Aerospace Journal Club every Fall and Spring semester they are registered for courses;
3. Have a final GPA GREATER than 3.0.

Learning Objectives are provided for each lecture with exam questions testing for competency over these Learning Objectives. The Learning Objectives for course are aligned with the Learning Objectives for the Board Certification exam administered by the Aerospace Physiology Society (AsPS) (CAsP | Aerospace Physiology Society).

Curriculum: Certificate in Aerospace Physiology Program

It is recommended that full-time students follow the course schedule below:

Fall Semester (9 credit hours)

*Introduction to AP I (PHOL 421) – 3 credit hours (Drs. Decker and Strohl)
*Exercise Physiology in Health and Disease (PHOL 487) – 3 credit hours (Dr. Jessica Taylor)
*Sleep Physiology (PHOL 614) – 3 credit hours (Dr. Decker)
**Aerospace Journal Club – 0 Credit hours (Dr. Jessica Taylor)

Spring Semester (9 credit hours)

*Introduction to AP II (PHOL 422) – 3 credit hours (Drs. Decker and Strohl)
*Laboratory Research Rotation: Aerospace Physiology (PHOL 423) - 3 credit hours (Drs. Decker, Damato and Strohl) **4 Day residency requirement**
**Aerospace Journal Club (Dr. Jessica Taylor) – 0 credit hours
Choose one, 3 credit course from the following:
*Oxygen Physiology (PHOL 410) – 3 credit hours (Dr. Joe LaManna)
*Comparative and Evolutionary Physiology (PHOL 485) – 3 credit hours (Dr. Joe LaManna)
*Clinical Reasoning II (PHOL 492) – 3 credit hours (Dr. Andrea Romani)
*Independent Study in Physiology (PHOL 451) – 3 credit hours (AP Advisor)
*Research in Physiology (PHOL 601) – 3 credit hours (Faculty in the Center for Aerospace Physiology)

* An existing course currently taught in the Department of Physiology and Biophysics
** This course will be submitted to the Graduate School via the Online Course

Action Form for approval.
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Met with CRAFT team (Brandi)

9. September 13-14,2021: Ryan Mayes, Brutus, Ron Riegle, Amanda Zehring visit CWRU

   This meeting was largely about research collaborations. Met with Dr. Walter Boron to discuss the potential for developing a Certificate and Master's programs in Aerospace Physiology within the Department.

Conclusions from these planning sessions:

The proximity of CWRU to the NASA Glenn Research Center and Wright Patterson Air Force Base is a strong advantage for the University developing Aerospace Physiology graduate programs. Also, the fact that Ohio is the #1 supplier to Boeing and Airbus, #7 in the US for Aerospace Defense jobs, and #2 in Aerospace Attractiveness will make our programs attractive to Aerospace industries in Ohio. The fact that our Department has the capability and track-record of administering an MS level graduate program totally online enables CWRU to attract students to a Certificate and MS program in Aerospace Physiology from all over the world.

Presently, the Certificate, Master's, and Ph.D. programs in "Human Factors" at the Embry-Riddle Aeronautical University in Daytona Beach, Florida, are the "go to" graduate programs for the Air Force. However, they are dissatisfied with these programs because they do not have a strong Physiology component. Also, the military services would like to be associated with an established research university which Embry-Riddle is not.

The current MS in Medical Physiology program at CWRU has too large a physiology component to satisfy the needs of the military services.

The courses in Aerospace Physiology will all be available online because prospective students will most likely be working full time in some aspect of the aerospace field. The focus groups expressed the need for a program (or programs) which contains courses along the lines of:

1. Two, 3 credit hour courses in Human Physiology as it relates to Aerospace
2. An Exercise/Sports Physiology course
3. A Sleep Physiology course
4. A Nutrition course
5. A Human Factors/Organizational Factors/Psychology course
6. A Human Factors/Systems Integration/Cognitive Science course
7. A Decision Making course
8. An Aerospace Forensics/Critical Reasoning/Pathology course
9. An Aerospace Laboratory Science course

10. **Letter of support from dean or other director of the appropriate university cost center.**

Two letters are appended, one from Dr. Walter Boron, Chair of the Department of Physiology and Biophysics and the second from Dr. Stanton Gerson, Dean of the Case Western Reserve School of Medicine.

APH-CT: AEROSPACE PHYSIOLOGY, GRADUATE CERTIFICATE

In Workflow

a. University Registrar Review (jpn30@case.edu; kjg23@case.edu)
b. Graduate Studies Dean Review (lxh5@case.edu; cer2@case.edu)
c. PHOL Chair (wfb2@case.edu)
d. MED Library Review (jed115@case.edu; twh7@case.edu)
e. MED UTech/International Affairs Review Vote (tmo13@case.edu; mxm346@case.edu)
f. MED Graduate Education Office Review (mxn83@case.edu; mcb19@case.edu)
g. MED Graduate Education Committee (npz@case.edu)
h. MED Faculty Committee (nmd11@case.edu)
i. MED Dean (slg5@case.edu; sxr406@case.edu)
j. Graduate Studies Dean Review (lxh5@case.edu; cer2@case.edu)
k. Faculty Senate Graduate Studies Committee (cec8@case.edu; lxh5@case.edu)
l. Faculty Senate Executive Committee (krm78@case.edu)
m. Faculty Senate (krm78@case.edu)
n. Board of Trustees (krm78@case.edu)
o. Provost Office - ODHE (cer2@case.edu; dlf4@case.edu)
p. Provost Office - HLC (dlf4@case.edu)
q. University Registrar - SIS Updates (hle@case.edu; ysd1@case.edu; hxg312@case.edu; jpn30@case.edu)
r. GRAD Updates (lxh5@case.edu; wtc22@case.edu)
s. Bulletin Updates - Univ Registrar (rea54@case.edu; jpn30@case.edu; kjg23@case.edu)

Approval Path

a. Wed, 02 Nov 2022 19:16:18 GMT
Jeremy Naab (jpn30): Rollback to Initiator
b. Wed, 09 Nov 2022 20:56:55 GMT
Jeremy Naab (jpn30): Approved for University Registrar Review
c. Wed, 09 Nov 2022 22:02:53 GMT
Charles Rozek (cer2): Approved for Graduate Studies Dean Review
d. Sat, 12 Nov 2022 16:56:55 GMT
Walter Boron (wfb2): Approved for PHOL Chair
e. Mon, 28 Nov 2022 18:52:51 GMT
Thomas Hayes (twh7): Approved for MED Library Review
f. Wed, 07 Dec 2022 17:27:14 GMT
2/2 votes cast.
Yes: 100% No: 0%
Jeremy Naab (jpn30): Approved for MED UTech/International Affairs Review Vote

New Program Proposal

Date Submitted: Fri, 04 Nov 2022 17:24:38 GMT

Viewing: APH-CT : Aerospace Physiology, Graduate Certificate

Last edit: Mon, 28 Nov 2022 18:52:45 GMT

Changes proposed by: Thomas Nosek (tmn2)

Requestor Information

Name
Thomas Nosek
E-mail
tmn2@case.edu
Network ID
tmn2

Department
Physiology and Biophysics
School
School of Medicine

Are you completing this form on behalf of someone?
No

Effective Date Information

Effective Term
Fall
Effective Year
2023

Program Information

Program Type
Degree/Program/Major/Certificate

Program School
School of Medicine

Program Department
Physiology & Biophysics

Does the proposal involve instruction, coursework or any resources from other departments or schools?
No

Academic Level
Graduate

Degree/Credential
Graduate Certificate

I have consulted with the CWRU representative to the Ohio Department of Higher Education (ODHE) prior to submitting this form
Yes

Program Title
Aerospace Physiology, Graduate Certificate

Minimum credit hours required for completion
18

Completion Time (years)
3

Will the proposed program follow standard academic calendar for your school?
Yes

Program Location
Main campus/Cleveland

Does this program follow the standard academic load for your school?
Yes

Academic Technology

Which academic and/or research technology resources will be used in this program (both online and in the classroom)?
Live streaming of all course and Journal Club lectures/discussions. Recording of all lectures/discussions so that students can view them asynchronously. We will use Canvas as the Course Management System for all courses.

Will any course in this program be offered online?
No

Will there be computing resources or data storage resources needed in this program beyond faculty and students' personal computers?

No

Will this program require applications not currently available through the university or the Software Center?

No

Do you anticipate needing additional technologies beyond what is already available in our Technology Enhanced Classrooms (TECs) and online (e.g., Canvas, Zoom, Echo360)?

No

Will this program require technical support beyond what is available through the Help Desk?

No

Program Rationale

Program Description

Aerospace Physiology (AP) is the study of the physical and cognitive impact of an extreme and/or austere environment upon an individual. Those studies provide the foundation to develop strategies conferring mental and physical resilience against extreme environmental conditions, thereby optimizing performance of the aerospace traveler. The objective of the Certificate in Aerospace Physiology program is to prepare students for careers in a wide range of fields (ex. Medicine - Civilian Government Physicians working in Aerospace Medicine or Aerospace Medicine Specialist Physicians working for the armed services; Research Physiologists - NASA Human Research Program or Navy Research Physiologist; Department of Transportation and Federal Aviation Administration - Medical Examiner or Aerospace and Environmental Physiologist; Commercial space companies - Virgin Galactic Research Coordinator or SpaceX medical support; USAF and USN - Aerospace Operational Physiologist) or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities.

Justification

No program at any level currently exists at CWRU in Aerospace Physiology. A series of focus groups conducted with future stakeholders conducted over the past 12 months has demonstrated a need and enthusiasm for an aerospace physiology-focused program at the Certificate level. The Department of Physiology and Biophysics is uniquely positioned to provide such a program. It is home to the Center of Aerospace Physiology (Dr. Michael Decker, Director). Four of the current faculty in the Department of Physiology and Biophysics are part of this center and have been identified by NASA, NATO, the US Air Force, and US Navy as both aerospace scientists and educators who are already training graduate students, military civilian and enlisted personnel in the core concepts of aerospace physiology. Because we anticipate that the majority of the students interested in this program will be working part or full time, we anticipate that the majority of our students will be taking this program on a part-time basis. Although the program can be completed in one year by a full-time student, part time students will probably take one, 3-credit hour course/semester and complete the program in 2-3 academic years (6 semesters).

Program Requirements (will appear in General Bulletin)

Program Requirements

The Certificate in Aerospace Physiology is available to students who have already earned a bachelor's degree in a physical or biological science. All courses (including the Aerospace Physiology Journal Club) are offered in a synchronous, traditional, lecture/small group format. The one exception to this is the 4-day, intense laboratory experience associated with the required the 3-credit hour "Laboratory Research Rotation: Aerospace Physiology" course (PHOL 423).

The Certificate in Aerospace Physiology program requires 18 credit hours of course work (6, 3-credit hour courses) and active participation in the Aerospace Physiology Journal Club each Fall and Spring semester students are registered for courses. To earn the Certificate, students must have a final GPA GREATER than 3.0 in at least 18 hours of graduate course work.

Sample Plan of Study

Full time students will follow the following Plan of Study to complete the program in 2 semesters. Part-time students can complete the program by taking as few as 1-3 credit hour course/semester over 6 semesters. All students must begin the program in a fall semester taking Introduction to Aerospace Physiology I followed by Introduction to Aerospace Physiology II spring semester.

Fall Semester (9 credit hours)

Introduction to Aerospace Physiology I (PHOL 421)– 3 credit hours

Exercise Physiology (PHOL 487) – 3 credit hours

Sleep Physiology (PHOL 614) – 3 credit hours

Aerospace Journal Club – 0 Credit hours

Spring Semester (9 credit hours)

Introduction to Aerospace Physiology II (PHOL 422)– 3 credit hours

Laboratory Research Rotation: Aerospace Physiology (PHOL 423) - 3 credit hours (**4 Day laboratory experience)**

Aerospace Journal Club – 0 credit hours

Choose one, 3 credit course from the following:

Oxygen Physiology (PHOL 410) – 3 credit hours

Clinical Reasoning II (PHOL 492) – 3 credit hours

Independent Study in Physiology (PHOL 451) – 3 credit hours

Research in Physiology (PHOL 601) – 3 credit hours

Concentration/Track/Field of Study

Does this program have any concentrations?

No

Program Learning Outcomes

Program Learning Outcomes

	Learning Outcome
Outcome 1	The learning outcome of the Certificate in Aerospace Physiology program is to prepare students for careers in the fields listed above or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities. At the end of this program, students should be ready to take and pass the Aerospace Medical Association (AsMA) Board Certification Examination in Aerospace Physiology and become a Board Certified Aerospace Physiologist. In this examination, students must demonstrate competency in the characteristics of the atmosphere, acceleration, spatial disorientation, and the physiology of decompression, thermos-regulation, hyperbarics, respiration, and cardiovascular function. Additional competencies in operational topics such as positive pressure breathing, noise, and LASER radiation must also be demonstrated.

Attachments

Attach File (optional)

Boron_LOS_AerospacePhysiologyCertificate.pdf
Gerson_LOS_AerospacePhysiologyCertificate.pdf
Aerospace Physiology, Graduate Certificate.pdf
Cert_AeroPhysiol.xlsx
Resource_Review_AerospacePhysiol.docx
Resource_Review_AeroPhysiol_Commentary.docx

End of Initiator Submission (save or submit at bottom of form)

Library Resources

Library Review

To be completed by Library staff

Report prepared by [librarian]

Thomas W. Hayes, MLS

Minimum additional resources

Current staffing is adequate

Yes

Library Technology resources

Adequate

Library Content resources

Mostly Adequate

Adequacy of current content resources

Books

Fully adequate

Journals

Partially adequate

Additional resources required
10 journal titles

One-time Costs ($)
34622

Recurring Costs ($)
1385

Databases
Partially adequate
Additional resources required
Embase

One-time Costs ($)
45000

Recurring Costs ($)
2250

Media
Fully adequate

Total One-time Costs ($)
79622

Total Annual Recurring Costs ($)
3635

Do you support this proposal?
Yes

Reviewer Comments
Jeremy Naab (jpn30) (Wed, 02 Nov 2022 19:16:19 GMT): Rollback: Per email.

Key: 424

APHV-CT: AEROSPACE PHYSIOLOGY, GRADUATE CERTIFICATE (ONLINE)

In Workflow

a. University Registrar Review (jpn30@case.edu; kjg23@case.edu)
b. Graduate Studies Dean Review (lxh5@case.edu; cer2@case.edu)
c. PHOL Chair (wfb2@case.edu)
d. MED Library Review (jed115@case.edu; twh7@case.edu)
e. MED UTech/International Affairs Review Vote (tmo13@case.edu; mxm346@case.edu)
f. MED Graduate Education Office Review (mxn83@case.edu; mcb19@case.edu)
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h. MED Faculty Committee (nmd11@case.edu)
i. MED Dean (slg5@case.edu; sxr406@case.edu)
j. Graduate Studies Dean Review (lxh5@case.edu; cer2@case.edu)
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l. Faculty Senate Executive Committee (krm78@case.edu)
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o. Provost Office - ODHE (cer2@case.edu; dlf4@case.edu)
p. Provost Office - HLC (dlf4@case.edu)
q. University Registrar - SIS Updates (hle@case.edu; ysd1@case.edu; hxg312@case.edu; jpn30@case.edu)
r. GRAD Updates (lxh5@case.edu; wtc22@case.edu)
s. Bulletin Updates - Univ Registrar (rea54@case.edu; jpn30@case.edu; kjg23@case.edu)

Approval Path

a. Wed, 09 Nov 2022 20:56:28 GMT
   Jeremy Naab (jpn30): Approved for University Registrar Review
b. Wed, 09 Nov 2022 22:04:44 GMT
   Charles Rozek (cer2): Approved for Graduate Studies Dean Review
c. Sat, 12 Nov 2022 16:57:06 GMT
   Walter Boron (wfb2): Approved for PHOL Chair
d. Mon, 28 Nov 2022 18:54:34 GMT
   Thomas Hayes (twh7): Approved for MED Library Review
e. Wed, 07 Dec 2022 17:27:27 GMT
   2/2 votes cast.
   Yes: 50% No: 50%
   Jeremy Naab (jpn30): Approved for MED UTech/International Affairs Review Vote

New Program Proposal

Date Submitted: Fri, 04 Nov 2022 17:32:41 GMT

Viewing: APHV-CT : Aerospace Physiology, Graduate Certificate (Online)

Last edit: Mon, 28 Nov 2022 18:54:30 GMT

Changes proposed by: Thomas Nosek (tmn2)

Requestor Information

Name
Thomas Nosek
E-mail
tmn2@case.edu
Network ID
tmn2

Department
Physiology and Biophysics
School
School of Medicine

Are you completing this form on behalf of someone?
No

Effective Date Information

Effective Term
Fall
Effective Year
2023

Program Information

Program Type
Degree/Program/Major/Certificate

Program School
School of Medicine

Program Department
Physiology & Biophysics

Does the proposal involve instruction, coursework or any resources from other departments or schools?
No

Academic Level
Graduate

Degree/Credential
Graduate Certificate

I have consulted with the CWRU representative to the Ohio Department of Higher Education (ODHE) prior to submitting this form
Yes

Program Title
Aerospace Physiology, Graduate Certificate (Online)

Minimum credit hours required for completion
18

Completion Time (years)
3

Will the proposed program follow standard academic calendar for your school?
Yes

Program Location
Main campus/Cleveland

Does this program follow the standard academic load for your school?
Yes

Academic Technology

Which academic and/or research technology resources will be used in this program (both online and in the classroom)?
Live streaming of all course and Journal Club lectures/discussions. Recording of all lectures/discussions so that students can view them asynchronously. We will use Canvas as the Course Management System for all courses.

Will any course in this program be offered online?
Yes

Is it possible for a student to take over half of the courses online?
Yes

Please provide additional details about online content

The certificate program will make use of courses offered by the Department of Physiology and Biophysics, some specifically designed for this program and others traditionally taught by the department. As with our MS in Medical Physiology program, online and resident students will have full access to all lectures/discussions, either via live streaming of all lectures or by viewing recorded presentations asynchronously. Additional course material will be available to all students via Canvas, the Course Management System. All exams and course requirements for resident and online students will be exactly the same. Grading of online and resident students will follow the same standards.

Will there be computing resources or data storage resources needed in this program beyond faculty and students' personal computers?

No

Will this program require applications not currently available through the university or the Software Center?

No

Do you anticipate needing additional technologies beyond what is already available in our Technology Enhanced Classrooms (TECs) and online (e.g., Canvas, Zoom, Echo360)?

No

Will this program require technical support beyond what is available through the Help Desk?

No

Program Rationale

Program Description

Aerospace Physiology (AP) is the study of the physical and cognitive impact of an extreme and/or austere environment upon an individual. Those studies provide the foundation to develop strategies conferring mental and physical resilience against extreme environmental conditions, thereby optimizing performance of the aerospace traveler. The objective of the Certificate in Aerospace Physiology program is to prepare students for careers in a wide range of fields (ex. Medicine - Civilian Government Physicians working in Aerospace Medicine or Aerospace Medicine Specialist Physicians working for the armed services; Research Physiologists - NASA Human Research Program or Navy Research Physiologist; Department of Transportation and Federal Aviation Administration - Medical Examiner or Aerospace and Environmental Physiologist; Commercial space companies - Virgin Galactic Research Coordinator or SpaceX medical support; USAF and USN - Aerospace Operational Physiologist) or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities.

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No program at any level currently exists at CWRU in Aerospace Physiology. A series of focus groups conducted with future stakeholders conducted over the past 12 months has demonstrated a need and enthusiasm for an aerospace physiology-focused program at the Certificate level. The Department of Physiology and Biophysics is uniquely positioned to provide such a program. It is home to the Center of Aerospace Physiology (Dr. Michael Decker, Director). Four of the current faculty in the Department of Physiology and Biophysics are part of this center and have been identified by NASA, NATO, the US Air Force, and US Navy as both aerospace scientists and educators who are already training graduate students, military civilian and enlisted personnel in the core concepts of aerospace physiology. Because we anticipate that the majority of the students interested in this program will be working part or full time, the program is available online on a part-time basis. Although the program can be completed in one year by a full-time student, part time students will probably take one, 3-credit hour course/semester and complete the program in 2-3 academic years (6 semesters). The Department of Physiology and Biophysics has extensive experience delivering graduate level courses and seminars online in its Master's in Medical Physiology program.

Program Requirements (will appear in General Bulletin)

Program Requirements

The Certificate in Aerospace Physiology is available to students who have already earned a bachelor's degree in a physical or biological science. All courses (including the Aerospace Physiology Journal Club) are offered in a synchronous, lecture/small group format with both a live broadcast and asynchronously from recordings over the Internet. The one exception to this is the 4-day residency requirement for the 3-credit hour required "Laboratory Research Rotation: Aerospace Physiology" course (PHOL 423).

The Certificate in Aerospace Physiology program requires 18 credit hours of course work (6, 3-credit hour courses) and active participation in the Aerospace Physiology Journal Club each Fall and Spring semester students are registered for courses. To earn the Certificate, students must have a final GPA GREATER than 3.0 in at least 18 hours of graduate course work.

Sample Plan of Study

Full time students will follow the following Plan of Study to complete the program in 2 semesters. Part-time students can complete the program by taking as few as 1-3 credit hour course/semester over 6 semesters. All students must begin the program in a fall semester taking Introduction to Aerospace Physiology I followed by Introduction to Aerospace Physiology II spring semester.

Fall Semester (9 credit hours)

Introduction to Aerospace Physiology I (PHOL 421) – 3 credit hours
Exercise Physiology (PHOL 487) – 3 credit hours
Sleep Physiology (PHOL 614) – 3 credit hours
Aerospace Journal Club – 0 Credit hours
Spring Semester (9 credit hours)
Introduction to Aerospace Physiology II (PHOL 422) – 3 credit hours
Laboratory Research Rotation: Aerospace Physiology (PHOL 423) - 3 credit hours **(4- Day residency requirement)**
Aerospace Journal Club – 0 credit hours
Choose one, 3 credit course from the following:
Oxygen Physiology (PHOL 410) – 3 credit hours
Clinical Reasoning II (PHOL 492) – 3 credit hours
Independent Study in Physiology (PHOL 451) – 3 credit hours
Research in Physiology (PHOL 601) – 3 credit hours

Concentration/Track/Field of Study

Does this program have any concentrations?
No

Program Learning Outcomes

Program Learning Outcomes

	Learning Outcome
Outcome 1	The learning outcome of the Certificate in Aerospace Physiology program is to prepare students for careers in the fields listed above or to enhance the backgrounds of those who are already working in these fields so that they can be more effective in fulfilling their responsibilities. At the end of this program, students should be ready to take and pass the Aerospace Medical Association (AsMA) Board Certification Examination in Aerospace Physiology and become a Board Certified Aerospace Physiologist. In this examination, students must demonstrate competency in the characteristics of the atmosphere, acceleration, spatial disorientation, and the physiology of decompression, thermos-regulation, hyperbarics, respiration, and cardiovascular function. Additional competencies in operational topics such as positive pressure breathing, noise, and LASER radiation must also be demonstrated.

Attachments

Attach File (optional)
Aerospace Physiology, Graduate Certificate (Online).pdf
Gerson_LOS_AerospacePhysiologyCertificate.pdf
Boron_LOS_AerospacePhysiologyCertificate.pdf
Cert_AeroPhysiol.xlsx
Resource_Review_AerospacePhysiol.docx
Resource_Review_AeroPhysiol_Commentary.docx

End of Initiator Submission (save or submit at bottom of form)

Library Resources

Library Review

To be completed by Library staff

Report prepared by [librarian]
Thomas W. Hayes, MLS

Minimum additional resources

Current staffing is adequate
Yes

Library Technology resources
Adequate

Library Content resources
Mostly Adequate

Adequacy of current content resources

Books
Fully adequate

Journals
Partially adequate
Additional resources required
10 Titles

One-time Costs ($)
34622

Recurring Costs ($)
1385

Databases
Partially adequate
Additional resources required
Embase

One-time Costs ($)
45000

Recurring Costs ($)
2250

Media
Fully adequate

Total One-time Costs ($)
79622

Total Annual Recurring Costs ($)
3635

Do you support this proposal?
Yes

Key: 425

Course Syllabus
Revised November 6, 2022

Introduction to Aerospace Physiology II
PHOL 422

Directors: Dr. Michael Decker (Michael.Decker@Case.edu)
Dr. Kingman Strohl (Kingman.Strohl@uhhospitals.org)

This is the second of two required Introduction of Aerospace Physiology courses for the proposed Certificate in Aerospace Physiology program. It is available, with the course director's permission, to all CWRU undergraduate and graduate students with the **prerequisite** that students have already successfully completed Introduction to Aerospace Physiology I (PHOL 421) or Medical Physiology I and II (PHOL 481 and 482).

Recurrently offered Spring semester each year starting Spring semester 2024.
3 Credit Hours: 2, 1.25 hour Classes/week

Primary a lecture/based course.

Offered both in person and online. All sessions streamed live and recorded for asynchronous viewing.

The Course Management System ***Canvas*** will be used to manage all course material.

Lectures will be given by faculty and staff in the Department of Physiology and Biophysics and the Center for Aerospace Physiology (Dr. Decker, Dr. Strohl, Dr. Damato, and Claire Maciejewski, MS), and Dr. Stan Gerson (an expert on the effects of radiation on the body). If the opportunity arises, we may have guest lecturers from the Military and Space communities who are experts in Aerospace Physiology give all or part of a lecture.

Evaluation:
Four, 50 question multiple-choice Block Exams (78% of final grade).

Block I	=20% of final grade =
Block II	=18% of final grade
Block III	=20% of final grade
Block IV	=20% of final grade

Eleven, 10 question multiple-choice Quizzes (22% of final grade).

Block I, Quiz 1	=2% of final grade
Block I, Quiz 2	=2% of final grade
Block I, Quiz 3	=2% of final grade
Block II, Quiz 4	=2% of final grade
Block II, Quiz 5	=2% of final grade
Block III, Quiz 6	=2% of final grade

Block III, Quiz 7	=2% of final grade
Block III, Quiz 8	=2% of final grade
Block IV, Quiz 9	=2% of final grade
Block IV, Quiz 10	=2% of final grade
Block IV, Quiz 11	=2% of final grade

Learning Objectives are provided for each lecture with exam questions testing for competency over these Learning Objectives. The Learning Objectives for this course are aligned with the Learning Objectives for the Board Certification exam administered by the Aerospace Physiology Society (AsPS) (CAsP | Aerospace Physiology Society).

Textbooks:

1. ***Medical Physiology*** by Walter F. Boron & Emile L. Boulpaep (B&B)
2. American Physiological Society ***711th Handbook*** (AP HB)

Aerospace Physiology entails an understanding of human performance in response to the challenges of work and exploration in at higher earth atmosphere and space. Human evolution over ~500,000 years built upon mammalian genetic and behavioral adjustments to earth's atmosphere. Advanced practice now includes social, cultural, and technology forces in civilian and military unique transportation and flight challenges at near space and space exploration. The principles of physiology learned in the study of normal and disease states were introduced in Introduction to Aerospace Physiology I.

Introduction to Aerospace Physiology II expands on basic physiologic principles to explore 4 areas of expertise, focusing on skills as well as knowledge. Whole body effects of individual environmental challenges (acceleration, hypoxia and hyperoxia, special disorientation, radiation and thermal challenges) and methods to identify and promote resilience will be considered. Forward leaning incident investigations require appreciation of behavioral interventions, measureable and modifiable human factors, and physiologic forensics and root cause analysis.

Block I: Normal Physiology in Abnormal Environments
This block uses examples of integrative physiology that result from the effects of acceleration, hypoxia and imposed hyperoxia, radiation exposures from high altitude and space travel, and adverse thermal environments.

Week #1

Class #1:	Introduction to Aerospace Physiology B&B Chapter 61 Environmental Physiology Dr. Walter Boron
Class #2	Acceleration Science AP HB Physiological Effects of Acceleration Dr. Michael Decker/Dr. Kingman Strohl

Week #2

Class #3:	**Quiz #1**

Hypoxia & Hyperoxia
AP HB Hypoxia
Dr. Kingman Strohl/Dr. Michael Decker

Class #4 Spatial Disorientation
AP HB Spatial Disorientation
Dr. Corey Smith

Week #3

Class #5: **Quiz #2**
Radiation
AP HB Radiation
Dr. Stan Gerson

Class #6 Thermal Effects
AP HB Thermal Effects
Dr. Lisa Damato

Week #4

Class #7: **Quiz #3**
Block I review
Dr. Kingman Strohl and Dr. Michael Decker

Class #8 **Block I Exam**

Supplemental Reading:

Pollock RD, Gates SD, Storey JA, Radcliffe JJ, Stevenson AT. Indices of acceleration atelectasis and the effect of hypergravity duration on its development. Exp Physiol. 2021 Jan;106(1):18-27. doi: 10.1113/EP088495. Epub 2020 May 10. PMID: 32281162.

Bonjour J, Bringard A, Antonutto G, Capelli C, Linnarsson D, Pendergast DR, Ferretti G. Effects of acceleration in the Gz axis on human cardiopulmonary responses to exercise. Eur J Appl Physiol. 2011 Dec;111(12):2907-17. doi: 10.1007/s00421-011-1917-0. Epub 2011 Mar 25. PMID: 21437604.

Fresnel E, Dray G, Pla S, Jean P, Belda G, Perrey S. Cerebral Oxygenation Responses to Aerobatic Flight. Aerosp Med Hum Perform. 2021 Oct 1;92(10):838-842. doi: 10.3357/AMHP.5896.2021. PMID: 34642006.

Minor LB. Physiological principles of vestibular function on earth and in space. Otolaryngol Head Neck Surg. 1998 Mar;118(3 Pt 2):S5-15. doi: 10.1016/s0194-5998(98)70002-6. PMID: 9525484.

Pattarini JM, Blue RS, Alexander DJ. Thermal Regulation of Emergency Oxygen

Supplies in Commercial Space Vehicles. Aerosp Med Hum Perform. 2018 Oct 1;89(10):918-922. doi: 10.3357/AMHP.5126.2018. PMID: 30219120.

Yang ZZ, Fei JX, Yu XJ. Thermal comfort and thermoregulation in manned space flight. Zhongguo Ying Yong Sheng Li Xue Za Zhi. 2013 Nov;29(6):518-24. PMID: 24654534.

Block II: Enhancing Resilience to the Physiological Stressors of Aerospace Environments
This block considers the behavioral factors that might enhance or mitigate human responses including nutrition, exercise, adequate sleep, and drug mitigation.

Week #5

Class #9: Nutrition Part 1 Anyone in the Department Partner with Nutrition
AP HB Nutrition
Claire Maciejewski, MS

Class #10 Nutrition Part 2
AP HB Nutrition and Performance
Claire Maciejewski, MS

Week #6

Class #11: **Quiz #4**
Exercise Physiology Part 1
B&B Chapter 60 Exercise Physiology and Sports Science
Dr. Kingman Strohl/Dr. Jessica Taylor

Class #12 Exercise Physiology Part 2
B&B Chapter 60 Exercise Physiology and Sports Science
Dr. Jessica Taylor/Dr. Kingman Strohl

Week #7

Class #13: **Quiz #5**
Sleep and Circadian Systems
Dr. Kingman Strohl

Class #14 **Block II Exam**

Supplemental Reading:

Laurens C, Simon C, Vernikos J, Gauquelin-Koch G, Blanc S, Bergouignan A. Revisiting the Role of Exercise Countermeasure on the Regulation of Energy Balance During Space Flight. Front Physiol. 2019 Mar 29;10:321. doi: 10.3389/fphys.2019.00321. PMID: 30984019; PMCID: PMC6449861.

Schneider S, Abeln V, Popova J, Fomina E, Jacubowski A, Meeusen R, Strüder HK. The influence of exercise on prefrontal cortex activity and cognitive

performance during a simulated space flight to Mars (MARS500). Behav Brain Res. 2013 Jan 1;236(1):1-7. doi: 10.1016/j.bbr.2012.08.022. Epub 2012 Aug 24. PMID: 22944515.

Steinman Y, Groen E, Frings-Dresen MHW. Exposure to hypoxia impairs helicopter pilots' awareness of environment. Ergonomics. 2021 Nov;64(11):1481-1490. doi: 10.1080/00140139.2021.1931474. Epub 2021 Jun 9. PMID: 34013831.

Lohi JJ, Huttunen KH, Lahtinen TM, Kilpeläinen AA, Muhli AA, Leino TK. Effect of caffeine on simulator flight performance in sleep-deprived military pilot students. Mil Med. 2007 Sep;172(9):982-7. doi: 10.7205/milmed.172.9.982. PMID: 17937364.

Neri DF, Oyung RL, Colletti LM, Mallis MM, Tam PY, Dinges DF. Controlled breaks as a fatigue countermeasure on the flight deck. Aviat Space Environ Med. 2002 Jul;73(7):654-64. PMID: 12137101.

Wright N, McGown A. Involuntary sleep during civil air operations: wrist activity and the prevention of sleep. Aviat Space Environ Med. 2004 Jan;75(1):37-45. PMID: 14736131.

Commented [KS1]: Aerospace I

Block III: Human Factors within Extreme Environments
This block presents the "Human Factors" as found in the FAA Classification system and its utility in examining errors or incidents. Such issues lead to a formal approach to the root causes for an unexpected problem or accident, including the impacts of fatigue, cognitive processing, physiologic capability, and the human interface with technology.

Week #8

Class #15: FAA Human Factors Classifications
AP HB Human Factors Analysis and Classification
Claire Maciejewski, MS

Class #16 Human Factors in Aircraft Accidents and Incident Investigation
AP HB Human Factors Analysis and Classification
Claire Maciejewski, MS

Week #9

Class #17: **Quiz #6**
Fatigue Part 1 Decker or Strohl
B&B Chapter 9 Skeletal, Cardiac, and Smooth Muscle
Dr. Michael Decker/Dr. Kingman Stroh.

Class #18 Fatigue Part 2
B&B Chapter 9 Skeletal, Cardiac, and Smooth Muscle
Dr. Kingman Strohl/Dr. Michael Decker

Week #10

Class #19: **Quiz #7**
Cognitive Processing Part 1
B&B Chapter 16 Circuits of the Central Nervous System
Dr. Lisa Damato

Class #20: Cognitive Processing Part 2
B&B Chapter 16 Circuits of the Central Nervous System
Dr. Lisa Damato

Week #11

Class #21 **Quiz #8**
Block III Review
Claire Maciejewski, MS

Class #22 **Block III Exam**

Supplemental Reading:

Li G. Pilot-related factors in aircraft crashes: a review of epidemiologic studies. Aviat Space Environ Med. 1994 Oct;65(10 Pt 1):944-52. PMID: 7832738

Wiegmann DA, Shappell SA. Human error analysis of commercial aviation accidents: application of the Human Factors Analysis and Classification system (HFACS). Aviat Space Environ Med. 2001 Nov;72(11):1006-16. PMID: 11718505.

Block IV: Aerospace Forensics

This block expands on Block III to address the forensic process rather than error assessment. Operational mishaps initiate a rather formal process of investigation and a 360° consideration of proximal cause. Examples of such events are presented to teams who will come to their conclusion and compare it with the final outcome, contrasting and accepting alternative explanatory models.

Week #12

Class #23: Introduction to Investigating Aviation Mishaps Part 1
AP HB Aerospace Operational Mishap Forensic Considerations
Claire Maciejewski, MS

Class #24 Introduction to Investigating Aviation Mishaps Part 2
AP HB Aerospace Operational Mishap Forensic Considerations
Claire Maciejewski, MS

Week #13

Class #25: **Quiz #9**
Safety and Accident Investigation Part 1

AP HB Aerospace Operational Mishap Forensic Considerations
Claire Maciejewski, MS

Class #26 Safety and Accident Investigation Part 2
AP HB Aerospace Operational Mishap Forensic Considerations
Claire Maciejewski, MS

Week #14

Class #27: **Quiz #10**
Human Factors in Aircraft Accidents Part 1
AP HB Aerospace Operational Mishap Forensic Considerations
Claire Maciejewski, MS

Class #28: Human Factors in Aircraft Accidents Part 2
AP HB Aerospace Operational Mishap Forensic Considerations
Claire Maciejewski, MS

Week #15

Class #29: **Quiz #11**
Block IV Review
Claire Maciejewski, MS

Class #30: **Block IV Exam**

Supplemental Reading:

Clark MA, Hawley DA, McClain JL, Pless JE, Marlin DC, Standish SM. Investigation of the 1987 Indianapolis Airport Ramada Inn incident. J Forensic Sci. 1994 May;39(3):644-9. PMID: 8006612.

Grabowski JG, Baker SP, Li G. Ground crew injuries and fatalities in U.S. commercial aviation, 1983-2004. Aviat Space Environ Med. 2005 Nov;76(11):1007-11. PMID: 16313136.

Diversity and Inclusion

It is the intent that all students regardless of their background and perspective be well-served by this class. Further, we intend to present material whose content is respectful of diversity (gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture) and deliver it in a way that respects these differences as well. We expect that all students, instructors and guests will help foster an atmosphere of respect, trust and safety in the classroom.

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Medicine Graduate Education Office (som-geo@case.edu) or the Office of Inclusion, Diversity and Equal Opportunity (OIDEO) (oideo@case.edu).

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In addition, the incident will be reported to the Dean of Undergraduate Studies and Academic Review Board for undergraduates or Senior Associate Dean of Graduate Studies, for Graduate Students. The CWRU Statement of Ethics for graduate students can be found here:

http://case.edu/gradstudies/about-the-school/policies-procedures/

Revised Syllabus November 30, 2022

Course number and title: **PHOL 423: Laboratory Research Rotation: Aerospace Physiology**

Lead Instructors: **Michael J. Decker, PhD**
Associate Professor of Physiology and Biophysics & Neurosciences; Director, Center for Aerospace Physiology, 216-368-2467; mjd6@case.edu
Lisa Damato, PhD
Associate Professor, School of Nursing
Department of Neurosciences, School of Medicine
Department of Physiology and Biophysics, School of Medicine
Case Center for Imaging Research, School of Medicine; Co-Director, Center for Aerospace Physiology, 216-368-2597; egd@case.edu
Kingman Strohl, MD
Professor, Department of Physiology and Biophysics, University Hospitals Cleveland Medical Center, Center for Aerospace Physiology 216-402-1543; kingman.strohl@case.edu
Teaching Assistant: To be Named

Class format and/or meeting times

The nature of the material taught in this course requires the class format to be both lecture based and laboratory based. During the first 6 weeks of the course, weekly 2-hour lectures in preparation for the on-campus 8 laboratory experimental session will be presented live in one of the classrooms in the Department of Physiology and Biophysics to the Resident students. These lectures will also be live streamed for synchronous viewing by Internet students. These lectures will also be recorded and posted in Canvas for asynchronous viewing/reviewing by both Resident and Internet students. Week 7, Thursday through Sunday, 8 morning and evening laboratory sessions will be held to conduct a series of 8 experimental sessions in the Department of Physiology and Biophysics on the Case Western Reserve University campus. All students in this course will be required to attend these laboratories in person. If students taking this course are also taking other courses at CWRU, the instructors will coordinate with the instructors of these other courses to make sure students are allowed to miss/make-up any classes that students miss on that Thursday and Friday. A ninth exercise will be conducted independently during week 8 of the semester. Weeks 9 – 14, live lectures (live streamed for synchronous viewing for Internet students and archived on Canvas for asynchronous viewing by both Resident and Internet students) are dedicated to reviewing the laboratory data collected in the 9 laboratories and discussing the current literature relevant to contemporary space and flight problems.

When the students are on campus, they will enhance their knowledge and skills of measurements and skills in aerospace physiology with various pieces of equipment (including a hypobaric chamber and a flight simulator). These exercises will help them practice collecting data for physiologic purposes

(blood pressure, EKG, EEG, EMG, oxygen saturation, ventilation, and pulmonary function). Following their data collection, students (whether online or on campus), will complete and submit a report for each of the 9 laboratories (format detailed below).

There will be approximately 4 hours/week of activities outside of the laboratory. These activities include data analysis, literature reviews and synthesis of material.

Course description:

One semester experience in the Center for Aerospace Physiology, with Drs. Michael Decker (Instructor), Lisa Damato (Co-Instructor), and Kingman Strohl (Co-Instructor), designed to introduce the student to aspects of research methods including the design, execution and analysis of original data collection of measures related to the Respiratory, Musculoskeletal, Nervous, and Cardiovascular systems relevant to Aerospace Physiology. Hands-on experiences will reinforce the strengths and limitations of current measures for human physiology.

Prerequisites and/or intended student population

All students enrolled in this course must have taken either the 3-credit hour Introduction to Aerospace Physiology I course or the 2, 6-credit hour Medical Physiology I and II courses. This course is available to all CWRU students, undergraduate or graduate, who have satisfied the pre-requisite course(s) and have the permission of the instructor.

Laboratory safety and CITI training classes must be completed prior to the beginning of the rotation.

There is a minimum of 5 people needed for the course to be offered.

Recommended and/or Required textbook(s) and/or other supplies:

All students must have a computer and Internet access to Canvas, the Course Management System that will be used for the course. Original papers that will be discussed will be provided in PDF format on Canvas. There is no textbook required for this course.

Learning objectives and Course Goals:

Learning Objectives are provided for each lecture. The Learning Objectives are aligned with the Learning Objectives for the Board Certification exam administered by the Aerospace Physiology Society (AsPS) (CAsP | Aerospace Physiology Society: https://www.aerospacephysiologysociety.org/casp)

This course when completed is a preparatory step for a successful application to take the Aerospace Medicine Certificate and become a Board Certified Aerospace Physiologist.

At the end of the course, students will:

1. Demonstrate an ability to measure the various physiological characteristics of the following systems that are important to Aerospace Physiology:
    a. Respiratory (the various lung volumes measured by spirometry, respiratory exchange ratio);
    b. Musculoskeletal (EMG, muscle strength, muscle length-tension relationship, muscle fatigue, effects of exercise);
    c. Nervous (EEG, basic neurological exam, reaction times, circadian rhythm), and;
    d. Cardiovascular (ECG, heart rate, blood pressure, blood oxygen saturation).
2. Describe how to use, and the benefits of using, a Flight Simulator and a Hypobaric Chamber;
3. Critically read, synthesize, and discuss current literature in Aerospace Physiology.
4. Produce a laboratory report on the physiological experiments that they will conduct during the course.

Course schedule/topics/plan:

Weeks 1-6 of the course are preparatory lectures for the laboratory experiments to be conducted in person during week 7 of the course.

Week 1 (2 hours)
Preparation relevant to in person Week 7 Laboratory #1and #2: **Spirometry: Lung Volumes and Heart Rate. Video review.**
Content. Review of Cardiopulmonary Physiology and Oxygen Delivery, the gradient from environmental oxygen to cellular utilization covered in Aerospace I. The points of measurement in human evaluations for functional eligibility for flight operations or in the recovery from an illness.

Week 2 (2 hours)
Preparation for in person Week 7 Laboratory #4: **EMG and Arm Wrestling**
Content: The principles of measurement, muscle length-tension adjustments, muscle fatigue, and recovery were presented in Aerospace II. Assessments in the in person laboratory by students will show measurement devices to uncover and understand muscle actions and the comparison of muscle groups

Week 3 (2 hours)
Preparation for in person Week 7 Laboratory #3: **EEG: The Stroop Effect, Vigilance and Reaction Time**
8 Module Video series
Content. Probing for mental function starts with standardized interrogation of person, place or time, and neurological examination. Flight operations involves mental functioning and the sensory system and integration of sight and touch with operational motor adjustments. The neurophysiology was covered in Aerospace I. Assessments of these systems is done using instruments measuring reaction time in the with and without competing tasks or decisions.

Week 4 (2 hours)
Preparation for in person Week 7 Laboratory #5 and 6: **Exercise I: the ECG and Peripheral Circulation**
Content. Stress on the cardiopulmonary systems is encountered in flight and space as covered in Aerospace I. This section will review the effects of exercise on cardiac performance in preparation for practical use of instruments which compare individuals to specific tasks.

Week 5 (2 hours)
Preparation for Laboratory #5 and #6: **Exercise II: Blood Pressure and Oxygen Saturation Levels.**
Content. Stress on the cardiopulmonary systems is encountered in flight and space as covered in Aerospace I. This second section will review the integrative effects of exercise on Oxygen delivery and the measeuments of oxygen saturation and blood pressure in preparation for practical experience which compare individuals to in these measures.

Week 6 (2 hours)
Preparation for Laboratory #6, #7, and #8: **Ventilation and Oxygen Saturation**
Content. The start and the end of Oxygen delivery is lung gas exchange and cellular respiration, as presented in Aerospace I. The lung components of tidal volume and frequency as mechanical limits and cellular oxygenation is not that of pulsatile oxygen saturation in large vessels but of near infrared tissue values.

Week 7
On Campus Laboratory Experience

Thursday, AM (3 hours)
Laboratory #1: **Spirometry: Lung Volumes and Heart Rate**

Measure Spirometry in two students. Measure inspiratory pressures. Do a slow vital capacity in the seated and the supine posture.

Purpose. Lung volume measures and respiratory muscle strength are useful measures in the assessment of fitness or recovery assessments.

Thursday, PM (3 hours)
Laboratory #2: **Respiratory Exchange Ratio (RER).**

The purpose of respiration is to import oxygen for cellular metabolism and excrete CO2 production from cellular respiration The RER is measured by end-tidal gases of CO2 and O2.

Under steady state rest the ratio if 0.8 but in non-steady state (exercise in particular) can be higher with a shift to anaerobic metabolism.

Friday, AM (3 hours)
Laboratory #3: **EEG and The Stroop Effect, Vigilance and Reaction Time Flight Simulator**

Purpose. Visual reaction times and the effects of decision making on reaction time with and without actions in the Flight Simulator.

Friday, PM (3 hours)
Laboratory #4: **EMG and Arm Wrestling**

Measure an EMG from a bicep muscle and from the nose. Flex the arm and flare the nose. Voluntarily activate and inhibit both muscle groups. Hold your breath and flex your arm for 5 seconds and then relax. Repeat with the nasal EMG.

Purpose. bipolar recordings of different muscle groups.

Saturday, AM (3 hours)
Laboratory #5: **Exercise, the ECG and Peripheral Circulation**

Take an ECG on two other students from a Lead I and Lead III placements, analyze the different waves in the EKG, and compare the two leads. Do 10 jumping Jacks, and look at signal quality and measure rate change.

Purpose. method of recording cardiac electrophysiology and a comparison of lead placements. Effect of brief exercise on catching the electrophysiology (movement, artifact and rate)

Identify the precordial heart sounds on two students at the apex and in the right precordial area. Can you hear the heart over the carotid artery? If not what might you hear?

Purpose. How sounds vary at different parts of the chest and whether they are transmitted distally

Saturday, PM (3 hours)
Laboratory #6: **Exercise, Blood Pressure and Oxygen Saturation Levels**

Take a blood pressure reading from the arm on two students supine and then standing. What is the difference in systolic and diastolic pressure between the two Now take a blood pressure from the leg in the supine posture. Is there a difference from the arms? Feel the radial pulse before and during when the other student breathes through a bent straw (4-5 breaths)..

Purpose. Blood pressure variability within and among individuals and with position. Effect of intrathoracic negative pressure swings on blood pressure and pulse. (pulsus paradoxicus)

Sunday, AM (3 hours)
Laboratory #7: **Ventilation and Oxygen Saturation Part I**

Take a blood oxygen reading on two students at rest...record every three seconds for 30 seconds. Now have the person hold their breath as long as they can and record the value every 3 seconds. What is the lowest value? Have the person take 10 deep breaths? Does oxygen saturation change and why?

Purpose. Variability in oxygen saturation in people over time and with changes in ventilation (breathhold and hyperventilation)

Sunday, PM (3 hours)
Laboratory #8: **Introduction to the hypobaric chamber Ventilation and Oxygen Saturation Part II**

Purpose. Tour the hypobaric chamber and learn about its operations including its safety features. In the chamber measure ventilation and pulse oximetry at sea level and at 5500 feet (Level for Denver) where oxygen content is 20% less than at sea level. You will be asked to measure saturation while you put on and off your shoes and after 3 deep breaths (hyperventilation) and one 10 second breath-hold.

Week 8 (2 hours)

Circadian Rhythm. Two weeks before this session you will be asked to complete a standardized sleep-wake diary and in this session we will cover the origins of circadian rhythm and the its utility and compare among students their interpretation of their results.

Weeks 9-14 are one hour sessions reviewing materials, questions, and doing formative assessments of the material in Aerospace Physiology I and II.

There are requirements for literature review of papers relevant to contemporary space and flight problems. This literature review will be interspersed among IQ Cases that will address relevant physiology from the point of view of "what do we not know"- the Ignorance Approach to pedagogy where the students in one session will identify learning objectives and in a second session the group will discuss what they found before the Objectives of the Case are disclosed. Of particular emphasis are instances where the concepts of physiology are needed to forensically address the causes for a fatal crash, a near-miss, or a sentinel event.

Assessment and Grading:

A final course average of 100% - 85% = A, 84% - 70% = B, and anything less than 70% = C.

Twenty percent (20%) of the final grade will be determined by student participation and attendance. A percentage between 0% (non-attendance) and 100% (attendance and engaged participation) will be assigned by the Instructors for each student for each class and for each laboratory. These percentages will be averaged for all classes and laboratories to define this part of the final average/grade.

Eighty percent (80%) of the final grade will be determined by the 9 Laboratory Rotation Reports. Students will write a scholarly laboratory report, $\leq$ 6 pages in length (single-spaced, 12 pt. font), organized as described below, for each of the 9 laboratory exercises. Reports are to be submitted on the last day of the lab discussion (weeks 8-14). Reports are to be submitted electronically, on Canvas. These reports will be evaluated by the Instructors and the TA for the course. These reports are weighted so heavily because they constitute the primary outcome of the course, reflecting: 1) the introduction to the laboratory experiments presented in weeks 1-6; 2) collection and analysis of the data collected during the laboratory experiments conducted in week 7 of the course, and; 3) discussion of the significance of the results during weeks 9-14 of the course. The reports will be judged against an ideal answer which will be disclosed to the student. We will give credit for improvements in the report from session 1 to 9

Suggested Report Format

a. Title Page. The title of the research project, student's name, and rotation lab.
b. Specific Aims. Provide a clear, concise, point-by-point summary of the aims of the research project. Do not exceed one-half page.
c. Background and Significance. Briefly sketch the background to the research project. Indicate the importance of the project to long-term research goals. Include relevant references. Do not exceed two pages (not including references).
d. Experimental Design and Methods. Describe the procedures and biological materials used in the project. Clearly indicate the contributions of others currently involved in the project. Do not exceed two pages.
e. Results. Describe the results of all experiments. Use tables and figures to present data.
f. Conclusions/Discussion. Discuss interpretation of results, significance of findings, limitations of the procedures, and future research directions. Do not exceed two pages.
g. References. List all references cited in the text, including all authors and the full title of the publication. (Pubmed format acceptable)

Course specific guidelines/rules/policies

Attendance is required, but excused absences due to medical school interviews, exams, or for medical reasons may be permitted. Planned absences must be reported beforehand to the Center for

Aerospace Physiology liaison. The contact information is provided to the students before classes start. Individual office appointments with the Instructor or Co-Instructors must be scheduled directly with them.

Late Assignment Policy

Late assignments are only acceptable if they are related to an excused absence. Arrangements must be made prior to the absence except in medical emergencies.

Resources available

The Writing Resource Center is available for help with writing assignments, from beginning to end. For more information, or to make an appointment, visit http://writingcenter.case.edu/.

The Health Sciences Library has many resources available that you may find useful for this course. Library staff is also available to help with literature searches. For more information, please visit http://case.edu/chsl/library/.

Diversity and Inclusion

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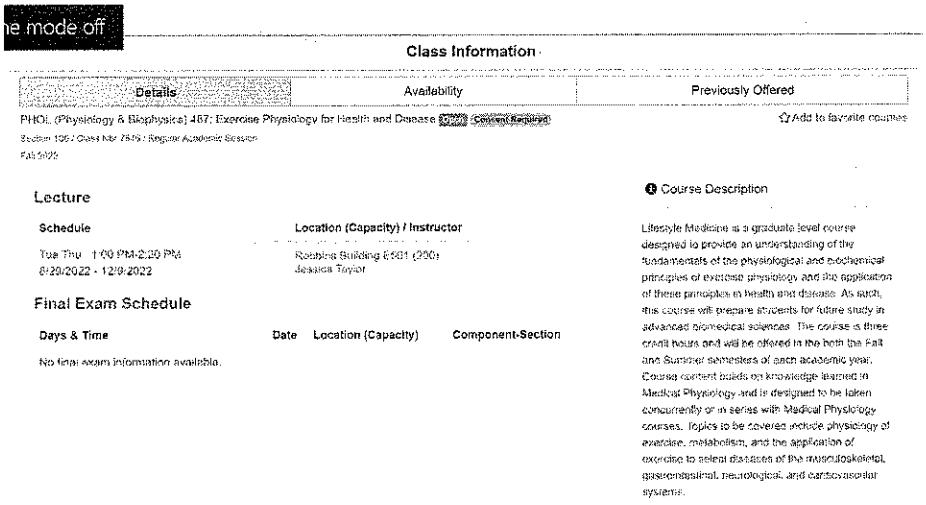
SIS Information for PHOL 487 Exercise Physiology for Health and Disease Dr. Jessica Taylor Course Director



University Hospitals
Cleveland Medical Center

SCHOOL OF MEDICINE
CASE WESTERN RESERVE UNIVERSITY

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January 26, 2023

Dear Dean Gerson,

This letter is to recommend the closing of the Department of Plastic Surgery at the School of Medicine and placing the members of the Department of Plastic Surgery in a Division of Plastic Surgery in the Department of Surgery at the School of Medicine.

In 2017, secondary to a small faculty and lack of a chairman, leadership at University Hospitals Cleveland Medical Center decided to close the Department of Plastic Surgery at the hospital and move the members of the Department into a newly formed Division of Plastic Surgery in the Department of Surgery. I recommend the medical school consider doing the same. Although we have been able to add faculty, the division continues to lack leadership and adequate faculty to stand on its own as a department. We continue our search for a new dynamic leader for plastic surgery.

Thank you for your consideration of this recommendation, and I would be happy to discuss.

Regards,

Joseph F. Sabik, III, MD