Pat L. Macko, PhD

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EDUCATION

2003-2009 Neverland University, Pixie, CA
Doctor of Philosophy (PhD), Physiology
Dissertation: Characterization of the signaling cascades for VSMC mitogenesis
1999-2003 Bachelor of Science (BS), Biology. Neverland University, Pixie, CA

CERTIFICATIONS

- 2012-2013 Essential Skills in Medical Education (ESME) Course Certificate
- 2013-2015 International Association of Medical Science Educators (IAMSE) Medical Educator Fellowship

POSTDOCTORAL TRAINING

2009-2012 Postdoctoral Fellow in physiology at the Cardiovascular Medicine Institute at Fairy Labs, Fairyville, CA

ACADEMIC APPOINTMENTS

2012-Present Assistant Professor of Biomedical Sciences; Top Dog School of Medicine, Downdog, CA

- M1 Curriculum Director
- Course director of medical physiology course
- Semester director of TBL curriculum
- Lecturer in physiology course (didactic, PBL/TBL)
- 2007-2012: Adjunct Faculty; Willie Wonka Community College, Wonkyville, CA
 - Anatomy & Physiology review course Massage Therapy Program
 - Anatomy & Physiology I & II lecture and lab (cadaver-based course)
 - Online Introduction to Anatomy & Physiology Course
 - Online Medical Terminology Course

INSTITUTIONAL SERVICE

- 2013-2018 Member, Curriculum Committee
- 2013-2016 Member, Research Committee
- 2014-present Faculty Advisor to the Cardiology Club
- 2016-present Member, Medical Student Admissions Committee
- 2017-present Member, Instructional Technology Committee

SOCIETY MEMBERSHIPS

2003-present American Physiological Society (APS)

- 2012-present Team Based Learning Collaborative (TBLC)
- 2012-present International Association of Medical Science Educators (IAMSE)
- 2014-present Association for Medical Education in Europe (AMEE)

HONORS & AWARDS

- 2018 Teaching award from students Top Dog School of Medicine
- 2017 Taylor Award for Outstanding Service Top Dog School of Medicine
- 2016 Teaching award from students Top Dog School of Medicine
- 2004 MedEdPORTAL Outstanding reviewer award
- 2001 Benty Memorial Scholarship Neverland University
- 1999 Dr. Sophia A. McDonald Academic Scholarship Neverland University

<u>GRANT</u>

The Effectiveness of ExamRx as a Supplemental Formative Assessment Resource for Medical Students PI: Macko and Blue 04/2018-04/2020 Funding Agency: ExamRx Challenge - \$5,000

PEER-REVIEWED PUBLICATIONS

- 1. **Macko P**, et. al., A Case of Congenital Heart Defect for First Year Medical Students Team Based Learning (TBL) Format. *MedEdPORTAL*; Jan 2019.
- 2. Macko P, et. al., Improving High-Stakes Assessments in Medical Education. *Med Educ Online*, 2018, 21:33
- 3. Halley, **Macko P**, Call, Pedros. Enhancing Knowledge Retention of Cardiovascular Physiology using Simulation. *Med. Sci. Edu.*, 2017 26(1):111-116.
- 4. **Macko P**, et. al., Inflammation and Blood Clotting Case for First Year Medical Students Team Based Learning (TBL) Format. *MedEdPORTAL*; Aug 2016.
- 5. **Macko P**, et. al., A Case of Mysterious Poisoning Team Based Learning Format. MedEdPORTAL; Jul 2015.
- 6. Freely, **Macko P**, Clems, Angiotensin II-dependent growth of vascular smooth muscle cells requires transactivation of the epidermal growth factor receptor via a cytosolic phospholipase A2-mediated release of arachidonic acid. *Arch. Biochem. Biophys.*, 2014, 498(1):50-6
- 7. **Macko P**, *et. al.*, Characterization of the Second Messenger Signaling Cascade Linking Angiotensin II Activation with Vascular Smooth Muscle Cell Mitogenesis. *Biochimica et Biophysica Acta (BBA)*, June 2013, volume 1716, issue 1, pages 11-16.

8. Wool, Fulton, Salsto, **Macko P**, Pheena. Tetracyclon Delivery from Fibrin Controls Peritoneal Infection Without Measurable Systemic Antibiotic. *Journal of Antimicrobial Chemotherapy* 2012, 48, 861-867.

*Additional publications during post-doctoral years are not shown.

SUBMITTED PUBLICATIONS

1. **Macko P**, *et. al.*, A Pre-matriculation Learning Program that Enables Medical Students with Low Prerequisite Scores to Succeed. *Med Teach*, Feb 2019.

IN PROGRESS

- 1. Macko P, et. al., The use of a phone interview during the admissions process to identify student attributes.
- 2. **Macko P**, *et. al.*, Challenges of Integrating a Longitudinal Course on Doctoring during Curricular Revision.

SELECTED PRESENTATIONS & POSTERS

- 1. **Macko P**, *et. al.*, Exploring the use of Facebook in a Medical Physiology Course, E-poster presentation, Association of Medical Educators in Europe (AMEE) Meeting, Lyon, France. August 2019.
- 2. Macko P, et. al., Game-Based Learning for Physiology. American Physiological Society. Chicago, IL. April 2018
- 3. **Macko P**, *et. al.*, Implementing Physiology as a Longitudinal Discipline Across an Integrated Curriculum. IAMSE. Burlington, VT. June 2017.
- 4. **Macko P**, *et. al.*, Does learning a practical skill like taking blood pressure improve understanding of cardiovascular concepts? Association of Medical Educators in Europe (AMEE) Meeting, Prague, Czech Republic. Aug 2016.
- 5. **Macko P**, *et. al.*, Focus Session: Confidence-Based Marking in a Cardiovascular Physiology Course. International Association of Medical Science Educators (IAMSE) Meeting, Cleveland, Ohio. July 2015.
- 6. Woolly, Seidel, Rojan, **Macko P** Confidence based marking in a medical physiology course. The FASEB Journal; 2014.
- 7. **Macko P**, *et. al.*, Angiotensin II stimulates reactive oxygen species-sensitive Akt activity via cytosolic phospholipase A2 and phosphoinositide 3-kinase in vascular smooth muscle cells. FASEB: A255, 2013.
- 8. Silfani, **Macko P**, Fulton, Stallone, Freeman. Estrogen or selective estrogen receptor modulators (SERMs) inhibit Ang II-induced arachidonic acid release and growth in vascular smooth muscle cells (VSMC). The FASEB Journal, 14(4): A456, 2012.

INVITED PRESENTATIONS & WORKSHOPS

- 1. **Pat Macko** Invited Faculty Development Workshop; "Team-Based Learning 101 Workshop". Kiss University, February 2018.
- 2. **Pat Macko** Invited Faculty development workshop. Writing Higher Order Exam Questions. Kiss University, April 2017.
- 3. **Pat Macko** Invited Faculty development workshop. How to Incorporate Active Learning into your lectures. Hugs University, October 2016.

FACULTY DEVELOPMENT

- 2019 Transition to a Systems-Based Curriculum Workshop at Top Dog SOM
- 2018 International Association of Medical Science Educators (IAMSE)
- 2018 Association of Medical Educators in Europe (AMEE)
- 2018 John Maxwell's Leadership Summit Workshop
- 2017 International Association of Medical Science Educators (IAMSE)
- 2017 Setting Justifiable Pass/Fail Scores
- 2016 Steven Covey Leadership Training Course
- 2016 International Association of Medical Science Educators (IAMSE)
- 2015 Developing a High-Quality Item Pool to Support Integrative Basic Science Exams
- 2015 International Association of Medical Science Educators (IAMSE)
- 2014 Team Based Learning Collaborative (TBLC)
- 2014 International Association of Medical Science Educators (IAMSE)
- 2013 Writing NBME-Style Test Questions
- 2013 Coaching and Mentoring Workshop at Top Dog School of Medicine
- 2013 International Association of Medical Science Educators (IAMSE)







EXCELLENCE IN TEACHING

DESCRIPTION

TITLE OF LEARNING ACTIVITY, SETTING, & TARGET LEARNERS

Cardiovascular physiology events in the cardiovascular systems block for second year medical students

MY TEACHING ROLE(S)

In addition to designing the sessions, I was responsible for creating learning objectives, facilitating the events, and submitting exam questions.

CONTACT WITH LEARNERS

I teach five unique one-hour sessions in this block. Approximately 150 students attend each session and I have been teaching in this block for eight years.

MY GOALS ADDRESS

My goal was to create clear, concise, and highly pertinent learning materials for the students in my sessions.

SCHOLARLY APPROACH

INFORMED PREPARATION

I read an active learning manual and reviewed the current literature on active learning methodologies for teaching physiology. I also attended a session on active learning and the flipped classroom at the IAMSE annual meeting.

DEVELOPMENT OF OBJECTIVES AND INSTRUCTIONAL METHODS

I drafted my learning objectives based on the American Physiological Society learning objectives, and I created case-based active learning sessions for the application of hemodynamics.

OUTCOMES AND EVALUATIONS

I have attached learner comments from the past three years, and I received a teaching award the second year I conducted these lectures.

MY REFLECTIVE CRITIQUE

After reviewing the session recordings from the first year, as well as peer and student evaluations, I decided to move one component of two different events into the pre-session preparation materials to provide participants with more time during the session to engage with peers.

SCHOLARSHIP/DISSEMINATION

DISSEMINATION

I submitted an article about one of the sessions to Medical Science Educator, the Journal of the International Association of Medical Science Educators (IAMSE), as an innovation in 2017. I was also selected through a peer-review process to present the design for one of my sessions at the IAMSE annual meeting in 2017. After the presentation, I was contacted by another institution in our country who requested my teaching materials for use at their own institution.



Learner Assessment



EXCELLENCE IN LEARNER ASSESSMENT

DESCRIPTION

ASSESSMENT TYPE, SETTING, and TARGET LEARNERS Summative assessment for the M2 cardiology course

MY ROLE IN ASSESSMENT

As the cardiology course director, I wrote 20% of the cardiology exam questions and edited 20% of the remaining examination questions to improve them from recall to higher-order questions.

MY GOAL

My goal was to build an exam consisting of at least 60% clinical vignettes, 20% data analysis, and less than 20% recall questions. I created and reviewed questions to ensure that clear, concise, clinically relevant MCQs with good discrimination were used to assess the course content.

SCHOLARLY APPROACH

INFORMED PREPARATION

I read the National Board of Medical Examiners (NBME)-style question writing manual and used it as a guide for writing NBME style questions for the course summative exam. In addition, I attended a NBME item writing session at the IAMSE annual meeting. I also consciously increased the number of second- and third-order examination items on my course summative examination to align with the course learning objectives through blueprinting.

DEVELOPMENT OF ASSESSMENT ITEMS OR TOOLS

I created a spreadsheet of all assessment items to review the difficulty, discrimination index, and point biserial of the items (data from ExamSoft©) used on the previous exam. In addition, I reviewed student challenges for these items to target my modifications towards improving question clarity and assessment of learning objectives. I also worked with clinical colleagues to revise my remaining basic science exam questions to include clinical vignettes.

OUTCOMES AND EVALUATIONS

I have included a table showing the item analysis of the exam questions and how I have improved the items over the course of three years. In addition, the correlation of my course grade to the national board examination has increased from 0.45 to 0.53 over the past three years.

MY REFLECTIVE CRITIQUE

I regularly use student feedback to improve exam items in my test bank. Additionally, feedback from the clinical course instructors and review of external assessment items indicates a need to increase the difficulty of exam questions around interpretation of ECGs. This will be the focus of revision for the upcoming course year.

SCHOLARSHIP/DISSEMINATION

DISSEMINATION

I co-authored a paper on "Improving High-Stakes Assessments in Medical Education", which was published in MedEdPORTAL (a peer-reviewed publication of the American Association of Medical Colleges).



Curriculum Development



EXCELLENCE IN CURRICULUM DEVELOPMENT

DESCRIPTION

TYPE OF CURRICULAR ELEMENT OR SESSION

M2 team-based learning (TBL) course for the second semester

SETTING AND TARGET LEARNERS

This course runs longitudinally throughout the first semester of the M2 year, during the hematology, cardiovascular, pulmonary, and renal blocks. Approximately 150 students are enrolled in the course per year.

MY ROLE

I serve as the course director, responsible for editing all course content and learning objectives, as well as coordinating the development and facilitation of interdisciplinary TBLs, and submitting assessment items based on the exercises.

NUMBER OF LEARNERS IMPACTED

150 students are enrolled in the course annually, and I have directed this course since 2014.

MY GOAL

My goal was to improve the existing TBL course, which did not follow the main pedagogic principles of TBL, including significant problem, same problem, specific choice, and simultaneous reporting. In addition, there was no readiness assessment prior to initiation of the application exercise. Through the revision, my goal was to standardize the TBL process in line with accepted TBL practices to enhance student integration and application of basic science knowledge.

SCHOLARLY APPROACH

INFORMED PREPARATION

I read the "How to Guide for Team Based Learning", then attended the Team Based Learning Collaborative (TBLC) annual meeting in 2014. Finally, I completed the Essential Skills of Medical Science Education (ESME) course and my scholarly project was "Team-Based Learning as a Longitudinal Course".

DEVELOPMENT OF OBJECTIVES

I worked with the faculty who direct the biomedical science courses to create learning objectives that are clear and measurable and use appropriate Bloom's verbs to reflect the higher order nature of the application exercise.

DESIGN OF INSTRUCTIONAL METHODS

The course follows traditional TBL pedagogy, but incorporates a wide variety of techniques into the preparatory materials. Specific technologies included videos I created using animation technology and glass lightboard technologies. We have included practice questions and exercises to make the preparatory materials as interactive as possible to increase student engagement with the preparatory materials.

OUTCOMES AND EVALUATIONS

This course now has improved learner ratings that are closer to outstanding than satisfactory after major revisions. In addition, student performance has increased on the concurrent basic science block exams, reflective of the higher order knowledge integration that is taking place during the TBL course.

MY REFLECTIVE CRITIQUE

I have reviewed student exam performance and evaluations, and I have spoken with my peers who use TBL. While student satisfaction with the longitudinal course is high, according to the clinical preceptors at our institution, there is room for targeted improvements to increase clinical decision-making skills. I agree that this is the most obvious area for improvement, so I am creating a working group composed of students and clinical faculty to help create these targeted changes to the course prior to its next iteration.

SCHOLARSHIP/DISSEMINATION

DISSEMINATION

I have published two of these TBL exercises in MedEdPORTAL (a peer-reviewed publication of the American Association of Medical Colleges):

- 1. A Case of Congenital Heart Defect for First Year Medical Students Team Based Learning (TBL) Format. MedEdPORTAL; Jan 2019.
- 2. Inflammation and Blood Clotting Case for First Year Medical Students Team Based Learning (TBL) Format. MedEdPORTAL; Aug 2016.



Advising & Mentoring



EXCELLENCE IN ADVISING AND MENTORING

DESCRIPTION

ADVISING/MENTORING ACTIVITY

I served as a formal advisor for the student cardiology interest group.

TYPE OF ADVISEE OR MENTEE

This group is composed of 12 students from our medical school across years M1-M4.

MY GOAL AS A MENTOR OR ADVISOR

My goal was to help students foster their interest in cardiology as a sub-specialty career choice.

SCHOLARLY APPROACH

INFORMED PREPARATION

I read the "SAGE Handbook of Mentoring" book edited by Clutterbuck et al. and used what I learned to lead an informal working group of my peers in discussion of our faculty roles as advisors to student interest groups.

DEVELOPMENT OF ADVISING OR MENTORING PLAN

After being asked to serve as a faculty advisor for this group (initiation phase), I read the aforementioned mentoring book and worked with the student leaders of the group to develop guidelines and action plan for the group (building phase). Since then, we have met twice per year to work towards the goals outlined for the group (sustaining phase). Each year, we celebrate students who will be graduating and pursuing cardiology as a career, and I have kept in touch with several of them as they enter their residencies and are no longer active members of the group (disengaging phase).

OUTCOMES AND EVALUATIONS

Since we began the interest group, we have had a steady enrollment and about 3% of each class who match in specialties that are intended to lead to a cardiology fellowship.

MY REFLECTIVE CRITIQUE

I keep a journal of my reflections on advising the group. At the end of each academic year, I meet with the students in the interest group and ask how I could have served them better in my advising role. I then reconcile this with my own reflections, and I believe this feedback has improved my role as an advisor.

SCHOLARSHIP/DISSEMINATION

DISSEMINATION

I worked with a group of students and faculty to develop the advising guidelines for student interest groups at my institution, and one of the students in the group presented it at the American Medical Student Association annual meeting as a poster in 2015.



Educational Leadership & Administration



EXCELLENCE IN LEADERSHIP AND ADMINISTRATION

DESCRIPTION

ROLE, TARGET AUDIENCE, AND NUMBER OF PEOPLE IMPACTED

I serve as the M1 curriculum director at my medical school, responsible for coordinating the 8 faculty members who run courses or blocks during the M1 year. Approximately 150 students are enrolled in this curriculum annually.

GOAL

I report to the associate dean for Medical Education. My first goal, handed down by the Curriculum Committee, was to integrate a longitudinal doctoring course among the basic science blocks during the M1 curriculum.

MY ROLE, DURATION and SCOPE

I was appointed to this new role of M1 curriculum director during our recent curricular revision in 2016. Although my goals in this role will change over time, the position is a new permanent part of our undergraduate medical education organizational chart.

SCHOLARLY APPROACH

INFORMED PREPARATION

I read several manuscripts, including "A model for integration of formal knowledge and clinical experience: the advanced doctoring course at Mayo Medical School" by Dyrbye et al. to understand how others were tackling this type of integration. I also spoke with colleagues at other institutions who have successfully completed this type of integration to understand and anticipate some common obstacles we may have encountered.

DEVELOPMENT OF LEADERSHIP OR ADMINISTRATION PLAN

I created a timeline for our working group, and a process by which the doctoring course directors would communicate with and gather feedback from the basic science block directors. Once we had a proposed curriculum modification, we created a new timeline for review from all block directors, followed by revision and then submission to the Curriculum Committee for final approval.

OUTCOMES AND EVALUATIONS

The new M1 curriculum with the additional doctoring course was rolled out in 2018. Student evaluations of the new curriculum are attached, showing their highly favorable opinions of the revision. This new structure was described at our site visit with the national accreditation body in mid-2019, and they had no significant problematic findings with the structure or implementation of our curricular revision.

MY REFLECTIVE CRITIQUE

After reviewing feedback from the Curriculum Committee, the students, and the national accreditation body, we would like to find a way to improve our peer feedback system within the M1 curriculum. We have student teams that extend between the doctoring course and the basic science blocks, and the next area identified for improvement will be targeted towards improving peer feedback systems to make them more holistic and less targeted towards one specific component of the curriculum.

SCHOLARSHIP/DISSEMINATION

DISSEMINATION

After discussing my experience with other colleagues who are planning to implement similar curricular revisions, I am currently preparing a manuscript, "Challenges of Integrating a Longitudinal Course on Doctoring during Curricular Revision" for submission to a medical education journal. This work will be submitted within the next 3 months.