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## MEMORANDUM

**To:** Donna E. Shalala, President

**From:** Tomas A. Salerno  
Chair, Faculty Senate

**Date:** April 30, 2015

**Subject:** Faculty Senate Legislation #2014-41(B) – Rosenstiel School of Marine and Atmospheric Science (RSMAS) New Track for the Master of Professional Science (MPS) Degree in Applied Remote Sensing in the Department of Ocean Sciences

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The Faculty Senate, at its April 22, 2015 meeting, voted unanimously to approve the proposal for an additional track for the Master of Professional Science (MPS) Degree in Applied Remote Sensing in the Department of Ocean Sciences. This new track will provide students with advanced training in the expanding field of remote sensing. It is designed to develop in its students the scientific knowledge and skills for utilizing data from a variety of remote sensing instruments on a variety of platforms for applications such as coastal monitoring. This new track will complement the other previously approved tracks for the MPS degree.


This legislation is now forwarded to you for your action.

TAS/rh

Enclosure

cc: Thomas LeBlanc, Executive Vice President and Provost  
Roni Avissar, Dean, Rosenstiel School of Marine and Atmospheric Science  
Brian Soden, Professor and Associate Dean, Professional Masters

**CAPSULE:** Faculty Senate Legislation #2014-41(B) – Rosenstiel School of Marine and Atmospheric Science (RSMAS) New Track for the Master of Professional Science (MPS) Degree in Applied Remote Sensing in the Department of Ocean Sciences

APPROVED:  DATE: 5/5/2015  
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: DEAN AVISSAR

EFFECTIVE DATE OF LEGISLATION: IMMEDIATELY  
(if other than June 1 next following)

NOT APPROVED AND REFERRED TO: \_\_\_\_\_

REMARKS (IF NOT APPROVED): \_\_\_\_\_

UNIVERSITY OF MIAMI

ROSENSTIEL  
SCHOOL of MARINE &  
ATMOSPHERIC SCIENCE



Master of Professional Science Program  
Rosenstiel School of Marine and Atmospheric Science  
University of Miami  
4600 Rickenbacker Causeway  
Miami, FL 33149

Phone: 305 421-4202

Email: b.soden@miami.edu

January 30<sup>th</sup>, 2015

## MEMORANDUM

Subject: Addition of a curriculum track for the MPS Program at RSMAS

Dear Colleagues:

The Rosenstiel School for Marine and Atmospheric Science seeks to enhance the Master of Professional Science (MPS) program by creating a new curriculum track for the MPS degree in the Department of Ocean Sciences, entitled **Applied Remote Sensing**. With an intended start in the fall semester 2015, this new track is designed to develop in its students the scientific knowledge and skills for utilizing data from a variety of remote sensing instruments (e.g. optical imagers, radiometers, radars) on a variety of platforms (spaceborne, manned and unmanned airborne, ship- and land-based) for applications such as coastal monitoring. *We emphasize that we are not seeking to create a new degree program, but rather to add an additional curriculum track to the existing MPS degree program.*

This MPS degree provides students with advanced training in the expanding field of remote sensing, including the understanding of theoretical aspects of remote sensing techniques, the state of the art in sensor technology, and data processing and analysis techniques. The graduates of this MPS track will be attractive candidates for positions that require a good knowledge (and in many cases a routine use) of remote sensing techniques for monitoring (e.g. ship traffic, floating sea ice and icebergs) and disaster response (e.g. hurricanes, oil spills, floods and fires) in coastal and open-ocean regions. Potential future employers of the graduates are U.S. government agencies such as the Department of Homeland Security, Coast Guard, Army, Air Force, Marines, Navy, National Oceanic and Atmospheric Administration, Environmental Protection Agency, National Park Service, and port authorities, corresponding institutions of other countries, as well as national and foreign businesses in the defense, offshore, fishing, shipping, and insurance sectors and businesses that develop and / or operate remote sensing instruments and / or derive higher-level data products from the basic data sets as a commercial service for end users. The MPS track will also be well suited for the existing workforce requiring retraining and updating of knowledge and skills for advancing their careers. RSMAS with its Center for Southeastern Tropical Advanced Remote Sensing (CSTARS) is an attractive training center as one of the leading remote sensing institutions in the U.S., with direct access to data from almost all major remote sensing satellite programs through its own receiving station and excellent connections to strong partner institutions (and potential future employers of the students) all over the world.

The new curriculum track is based on the existing courses Physics of Remote Sensing I and II (MPO 542 and AMP 542), which are being taught every year in the fall and spring semester, respectively. They will be complemented by two new 500-level courses that will be tailored specifically to the needs of the MPS students. These new courses will be more application-oriented than MPO 542 and AMP 542 and include a number of supervised exercises in data processing, GIS use, etc. They will partly take place at CSTARS. They will be co-taught by OCE faculty, data processing staff of CSTARS, and guest lecturers from RSMAS and elsewhere (e.g. UM College of Engineering, government agencies), and experienced graduate students as teaching assistants. The purpose of the new courses is to prepare the MPS students for the specific requirements of typical positions for MPS graduates and to provide them with hands-on experience needed in the workplace.

**Background on the MPS Program**

Launched in the Fall of 2010, the Master of Professional Science is an innovative graduate degree at the University of Miami, intended for students who seek advanced training in marine and atmospheric science. The MPS is a professional degree, rather than a traditional research-based MS degree. It is designed for students who major in the sciences as undergraduates and seek careers which require both applied scientific knowledge and professional skills. By emphasizing applied training and internships, rather than research, the MPS offers students a direct and more efficient route into business and industry. This program prepares students for science careers in business, government, or non-profit organizations, where employment demands are growing.

The MPS degree currently offers specialization in fifteen different curriculum tracks within four academic programs at RSMAS. The tracks currently offered are listed in the table below.

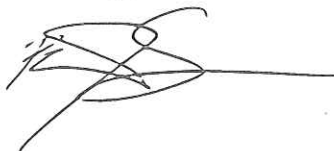
<b>Marine Biology and Fisheries (MBF)</b>	<b>Meteorology and Physical Oceanography (MPO)</b>	<b>Marine Affairs and Policy (MAF)</b>	<b>Ocean Sciences (OCE)</b>
<ul style="list-style-type: none"> <li>● Fisheries Management and Conservation</li> <li>● Marine Mammal Science</li> <li>● Oceans and Human Health</li> <li>● Tropical Marine Ecosystem Management</li> </ul>	<ul style="list-style-type: none"> <li>● Broadcast Meteorology</li> <li>● Computational Meteorology and Oceanography</li> <li>● Weather Climate &amp; Society</li> <li>● Weather Forecasting</li> </ul>	<ul style="list-style-type: none"> <li>● Aquaculture</li> <li>● Coastal Sustainability</li> <li>● Coastal Zone Management</li> <li>● Exploration Science</li> <li>● Marine Conservation</li> <li>● Underwater Archeology</li> </ul>	<ul style="list-style-type: none"> <li>● Natural Hazards and Catastrophe Analytics</li> </ul>

In addition, there is a joint JD / MPS degree program in collaboration with the School of Law.

In its first four years, enrollment in the MPS program already exceeds 50 students per year and the program has been tremendously successful in preparing students for entry-level careers in the marine sciences. Over 60% of our students graduate in 15 months or less, and 96% graduate within 20 months of enrolling in the program. Over 80% of our graduates have found employ-

ment in their field of study. The expansion of the MPS program into the Department of Ocean Sciences is essential for the continued development and expansion of the MPS program at RSMAS.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Soden", with a long horizontal line extending to the right.

Brian Soden  
Associate Dean for MPS  
Rosenstiel School of Marine and Atmospheric Science

## Details of the *Applied Remote Sensing* Curriculum Program

### *Credits*

24 Credits for 8 courses (2 semesters) and 6 credits for internship (3-6 months). We anticipate internships to be available at the institutions that are potential employers for the graduates (e.g. Department of Homeland Security, Coast Guard, Army, Air Force, Marines, Navy, National Oceanic and Atmospheric Administration, Environmental Protection Agency, National Park Service, port authorities, businesses in the defense, offshore, fishing, shipping, and insurance sectors, businesses that develop and / or operate remote sensing instruments and / or derive higher-level data products as a commercial service) and at CSTARS.

### *Courses*

We anticipate the development of two new remote sensing courses that will be tailored to the specific needs of MPS students and complement the existing courses MPO 542, Physics of Remote Sensing I – Passive Systems in the fall semester and AMP 542, Physics of Remote Sensing II – Active Systems in the spring semester. The two new courses plus MPO 542 and AMP 542 will be the four core courses of the Applied Remote Sensing track.

### *New Core Courses*

The two new courses will be more application-oriented than MPO 542 and AMP 542 and include a number of supervised exercises in data processing, GIS use, etc. They will partly take place at CSTARS. They will be co-taught by OCE faculty, data processing staff of CSTARS, and guest lecturers from RSMAS and elsewhere (e.g. UM College of Engineering, government agencies), and experienced graduate students as teaching assistants. The purpose of the new courses is to prepare the MPS students for the specific requirements of typical positions for MPS graduates and to provide them with hands-on experience needed in the workplace.

### *Electives*

The following existing courses taught at RSMAS have been identified as electives that could be selected by students in the MPS track Applied Remote Sensing:

#### *(Fall Semester)*

- MAC 503: Principles of Marine and Atmospheric Chemistry
- MAF 502: Economics of Natural Resources
- MAF 516: Ocean Policy and Development
- MAF 520: Environmental Law
- MAF 530: Port Operations
- MAF 620: Coastal Law
- MBF 515: Tropical Marine Ecology
- MPO 503: Physical Oceanography
- MPO 551: Introduction to Atmospheric Science
- MPO 631: Air-Sea Interaction
- RSM 512: Statistics for Environmental Management

*(Spring Semester)*

- AMP 531: Ocean Measurements
- MAC 605: Chemical Oceanography
- MAF 510: Environmental Policy & the Environmental Impact Statement
- MAF 518: Coastal Zone Management
- MPO 524: Applied Data Analysis
- MAF 530: Port Operations
- MAF 560: Introduction to Marine GIS
- MPO 623: Statistical Analysis of Geophysical Data

Depending on the background and career plans of the students, other electives may be picked in coordination with the students' advisors on a case-by-case basis. Furthermore, the new courses that have been proposed as part of the MPS track Natural Hazard and Catastrophe Analytics will be of interest to some students in the Applied Remote Sensing track:

- OCE XXX: Natural Hazards – Solid Earth and Oceans
- OCE XXX: Natural Hazards – Atmosphere and Oceans
- OCE XXX: Hydrological Hazards
- OCE XXX: Data Management, Processing and Visualization
- OCE XXX: Statistical Methods and Modeling

***Sample Curriculum***

*Fall Semester*

- MPO 542: Physics of Remote Sensing I – Passive Systems
- OCE XXX: Applied Remote Sensing I – Passive Systems
- RSM 512: Statistics for Environmental Management (or another elective)
- OCE XXX: Natural Hazards – Solid Earth and Oceans (or another elective)

*Spring Semester*

- AMP 542: Physics of Remote Sensing II – Active Systems
- OCE XXX: Applied Remote Sensing II – Active Systems
- MAF 518: Coastal Zone Management (or another elective)
- OCE XXX: Data Management, Processing and Visualization (or another elective)

***Prerequisites***

Students entering this track need to have a Bachelor's degree in Mathematics, Physics, Geosciences, or Engineering or an equivalent degree from an accredited U.S. institution of higher education with a minimum GPA of 3.0. It is expected that the following courses (or equivalent courses) have been successfully completed: Calculus, Statistics, Physics, Computer Programming (Matlab, IDL, C, or Fortran). Deficiencies in the required courses may be considered on a case by case basis for otherwise highly qualified students.

***Staffing Impact***

The courses of the Applied Remote Sensing track will be taught by existing RSMAS faculty and staff on the RSMAS and CSTARS campuses, with the exception of some electives that are available to MPS students on the UM main campus. This track is to be added to the existing MPS program, and hiring of new staff is not anticipated.

### *Relation to the MS Degree Program in Ocean Engineering*

Beginning in fall 2015, the University of Miami's College of Engineering and RSMAS are also offering a new MS degree program in Ocean Engineering with a track "Remote Sensing and Maritime Security". Like the MPS program, the Oceanic Engineering program is a non-thesis program; it can be completed within 12-15 months. There are some overlaps with the MPS track proposed here, but the Ocean Engineering program is tailored to the needs of students on a career path in engineering and includes engineering courses that are not part of the MPS track curriculum, such as "Digital Signal Processing", EEN 536. Students on its "Remote Sensing and Maritime Security" track must take two out of the three courses "Introduction to Underwater Acoustics" (AMP 535), "Underwater Imaging", and "Physics of Remote Sensing" (MPO 542), plus a capstone course "Applied Problems in Remote Sensing". In contrast, students on the MPS track proposed here must take the two courses "Physics of Remote Sensing I – Passive Systems" (MPO 542) and "Physics of Remote Sensing II – Active Systems" (AMP 542) plus two corresponding application-oriented courses and courses on large dataset handling and visualization and statistical analysis as described above, while ocean acoustics and underwater imaging are not part of their curriculum. Furthermore, the MPS students have to complete a 3-6 month internship related to their field, while an internship is not required in the Ocean Engineering curriculum. While the Ocean Engineering curriculum is more engineering-oriented and covers a broad range of measurement, data processing, and numerical simulation techniques, the MPS students on the track proposed here will acquire more in-depth knowledge in the specific field of using and interpreting images acquired by instruments on satellites or airborne platforms. In typical work environments, one would expect to find the Ocean Engineering graduates where a variety of instruments and data processing equipment are being set up and measurements are being taken, while the MPS graduates would be the ones who use and interpret satellite images on a routine basis in the context of monitoring tasks.



UNIVERSITY OF MIAMI  
**ROSENSTIEL**  
**SCHOOL of MARINE &**  
**ATMOSPHERIC SCIENCE**



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October 17, 2014

Prof. Brian Soden  
Associate Dean for Professional Studies  
Rosenstiel School of Marine and Atmospheric Sciences  
University of Miami

Dear Brian:

The faculty of the Department of Ocean Sciences approved the *Remote Sensing* and *Natural Hazard and Catastrophe Analytics* MPS tracks by anonymous ballot. Following are the tallies.

Best wishes,

A handwritten signature in cursive script that reads "Dennis A. Hansell".

Dennis Hansell  
Chairman, Department of Ocean Sciences

	YES	NO	ABSTAIN
Natural Hazards & Catastrophes	23	1	1
Remote Sensing	22	1	1



## MEMORANDUM

TO: Professor Tomas Salerno, UM Senate Chair  
FROM: Roni Avissar, Dean *Roni Avissar*  
DATE: March 31, 2015  
SUBJECT: MPS Track in "Applied Remote Sensing"

I approve and strongly support the RSMAS proposal to develop a new track in the Master of Professional Science (MPS) Program in "Applied Remote Sensing." This new track is designed to develop in its students the scientific knowledge and skills for utilizing data from a variety of remote sensing instruments (e.g., optical imagers, radiometers, radars) on a variety of platforms (spaceborne, manned and unmanned airborne, ship and land-based) for applications such as coastal monitoring.

This new track will NOT necessitate the recruitment of new tenured / tenure-track faculty as it will rely on existing faculty already employed at RSMAS and not currently occupied to teach in other RSMAS programs. Furthermore, the administrative needs for this new track will benefit from the existing administrative and infrastructure support put in place for the existing MPS Program. Since our MPS program is based on revenues from students' tuition, this track is expected to contribute positively to the budget of RSMAS and will not have any negative impact on the School or the University finances.

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Roni Avissar, Ph.D.  
Professor and Dean

Phone: 1 305 421-4000 • Fax: 1 305 421-4711 • E-mail: [ravissar@rsmas.miami.edu](mailto:ravissar@rsmas.miami.edu)

UNIVERSITY OF MIAMI

ROSENSTIEL  
SCHOOL of MARINE &  
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Miami, Florida 33149-1031

January 27, 2015

To: University of Miami Faculty Senate

I am writing this letter in support of the establishment of an Master in Professional Sciences track in Applied Remote Sensing. I serve as the Director of the newly established MS in Ocean Engineering joint program between RSMAS and the College of Engineering. It is my belief that this track will be an excellent complement to the engineering oriented MS in Ocean Engineering track in Remote Sensing and Maritime Security. The students interested in and entering the two programs will have different backgrounds and expect different outcomes from their graduate education. Having a full suite of programs from highly technical training to more user oriented applied studies serves both the interests of the University of Miami and a broad range of potential students. In summary the proposed MPS programs complements existing programs rather than competing with each them and the University of Miami will benefit from it.

Sincerely,

Prof. Brian K. Haus  
Director of MSOE program  
Department of Ocean Sciences



Office of Planning,  
Institutional Research,  
and Assessment


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MEMORANDUM

**DATE:** March 4, 2015

**TO:** Dr. Brian Soden, Professor  
Department of Atmospheric Sciences  
Rosenstiel School of Marine and Atmospheric Science

**FROM:** David E. Wiles, Executive Director  
Assessment and Accreditation 

**SUBJECT:** MPS Track in Applied Remote Sensing

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On February 23, 2015, the Rosenstiel School of Marine and Atmospheric Science submitted a proposal notifying our office of its intent to offer a new Master of Professional Science (MPS) track option in Applied Remote Sensing beginning in the fall of 2015. The track will be comprised of existing courses in the Rosenstiel School, along with other schools and colleges at the University of Miami, and will require the development of two new courses in Ocean Engineering that will meet the specific needs of MPS students and complement presently existing courses:

- OCE XXX—Applied Remote Sensing I – Passive Systems
- OCE XXX—Applied Remote Sensing II – Active Systems

All courses, including the two newly proposed, will be taught by existing faculty in the Ocean Sciences Department and guest lecturers at the Rosenstiel School and the College of Engineering. The 12-month program will include two semesters of coursework and a 3-6 month internship with private companies and government offices. Based on these details, the MPS track addition is not considered substantive in nature and should not require approval from the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) prior to its implementation.

Please feel free to contact our office should you have any further questions (305) 284-9431.

cc: Faculty Senate  
Dr. M. Brian Blake, Vice Provost and Graduate School Dean  
Dr. Roni Avissar, Dean, RSMAS  
Dr. James M. Tien, Dean, College of Engineering

UNIVERSITY OF MIAMI  
GRADUATE SCHOOL



M. Brian Blake, Ph.D.  
Vice Provost for Academic Affairs  
& Dean of the Graduate School

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MEMORANDUM

DATE: March 25, 2015  
TO: Tomas Salerno  
Chair, Faculty Senate  
FROM: M. Brian Blake  
Dean, The Graduate School  
SUBJECT: New Track for MPS Degree

A handwritten signature in black ink, appearing to read 'M. B. Blake'.

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The Rosenstiel School of Marine and Atmospheric Science submitted a proposal for a new track for MPS degree in the Department of Ocean Sciences – Applied Remote Sensing. The addition of the new track was discussed at the meeting of the Graduate Council on Tuesday, March 17, 2015, and none of the Graduate Council members expressed any concerns.

cc: Roni Avissar, Dean  
Brian Soden, Associate Dean  
Office of Planning, Institutional Research and Assessment



April 2, 2015

To: Dr. Roland Romeiser, Associate Dean Soden

From: Rana Fine, Professor and Vice Chair RSMAS School Council

A handwritten signature in black ink that reads "Rana Fine". The signature is fluid and cursive, with the first name "Rana" and last name "Fine" clearly distinguishable.

This is written in support of establishing a new track for the Ocean Sciences Department in **Applied Remote Sensing** for the Rosenstiel School's Master of Professional Science degree. On 1 April the School Council met and **unanimously approved** the entire package with a vote of 5-0, 2 representatives had emailed their votes previously.

Cc: Dean Avissar, Chair Dennis Hansell, Ms. Cassandra Wiggins

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