Ph.D. in Planetary and Space Sciences
CIP 40.0203
University of Central Florida

Board of Governors' Staff Analysis
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Program Description and Overview

The University of Central Florida (UCF) proposes a Ph.D. in Planetary and Space Sciences to be housed within the Department of Physics and the Florida Space Institute. The program is currently offered as a track under the Ph.D. in Physics, and the request is to elevate the track to a stand-alone degree program. The program broadens the areas of study to include not only physics but also astrochemistry, astrogeology, astrobiology, artificial intelligence (AI) and computation, and scientific instrument development. Prospective students may enter the program with either a master's or a bachelor's degree in a relevant field, including physics, astronomy, geology, atmospheric sciences, or planetary sciences.

Students entering with a master's degree must complete 33 credit hours, while those entering with a bachelor's degree must complete 72 credit hours. In the Ph.D. program, students must pass a candidacy examination and conduct original dissertation research, which they must defend before a faculty committee.

Program graduates will have the knowledge and skills necessary for roles in governmental agencies such as the National Aeronautics and Space Administration (NASA), the private space industry, academia, and research institutions. Graduates will be prepared to work as astronomers, atmospheric and space scientists, natural science managers, and faculty in space science-related fields.

The University of Central Florida's Board of Trustees approved the program on December 5, 2024. If approved by the Board of Governors, this will be the first Ph.D. program in the System in CIP 40.0203. Table 1 provides a summary overview of the Ph.D. in Planetary and Space Sciences.

Table 1: Proposed Program Summary

Ph.D. in Planetary and Space Sciences	
Tuition per Credit Hour	$369.65 Florida Resident $1,194.05 Non-Resident
Delivery Mode	Traditional
Location	Main Campus
Graduation Requirements	33 – 72 Graduate Credit Hours (entering with or without a master's affects credit hours)
Effective Date	Fall 2025

Source: University of Central Florida Ph.D. in Planetary and Space Sciences Proposal

Need for Graduates in the Labor Market

The proposed program offers an interdisciplinary approach to space science and space exploration topics. These topics include astrochemistry, astrogeology, astrobiology, AI and computation, and scientific instrument development. The program will position graduates for jobs such as astronomers, atmospheric and space scientists, natural science managers, and postsecondary faculty in Florida and nationally.

The Planetary Sciences Group at the University of Central Florida has current program faculty who work closely with space industry partners on active, funded projects and understand the required competencies for program graduates. In addition to this group, the university reported starting an advisory council with industry partners and the collaborating campus partners.

Doctoral Degrees Awarded in Planetary Science-Related Programs by Institution

The University of Central Florida's proposed program would be the first Ph.D. program under CIP 40.0203 in the System. Similar programs are offered at the University of Florida, the University of South Florida, and Florida State University. However, these programs primarily focus on traditional astronomy or earth-based geology, while the proposed program will emphasize an interdisciplinary approach to planetary and space sciences. As shown in Table 2, 19 doctoral degrees were awarded in geology during the 2023-24 Academic Year across the System. University of Central Florida reported that 21 Ph.D.s have been awarded in the program as a track, with 20 graduates finding employment in the field following graduation.

Table 2: Degrees Awarded, Ph.D. in Geology, CIP 40.0601

Institution	2019-20	2020-21	2021-22	2022-23	2023-24
FIU	5	6	4	13	9
FSU	1	6	4	-	3
UF	3	5	5	4	4
USF	9	6	6	3	3
Total	**18**	**23**	**19**	**20**	**19**

Source: Board Office of Data Analytics, Degrees Awarded by CIP, retrieved 3/10/2025.

Workforce Demand

The proposed Ph.D. program in Planetary and Space Sciences will position graduates for employment opportunities that are projected to grow in Florida and nationwide. These include positions as astronomers, atmospheric and space scientists, natural science managers, and postsecondary faculty in atmospheric, earth, and space sciences. Table 3 provides additional details on the future workforce demand for these occupations.

Nationally, the number of jobs for astronomers is projected to grow by more than seven percent through 2033, with an average of 200 job openings annually. Currently, the

workforce demand in Florida is not available for this occupation. Given that a doctoral or professional degree is required for entry into this field, graduates of this program will be well-positioned for roles in government agencies, observatories, space exploration companies, and academic institutions. The current national median salary for astronomers is $128,330.

Graduates may also be prepared for positions as atmospheric and space scientists. While a bachelor's degree is the minimum education required for these positions, graduates of this Ph.D. program will also be qualified for advanced research roles. The number of jobs for atmospheric and space scientists in Florida is projected to increase by more than 11 percent through 2032, with an average of 90 job openings per year. Nationally, this field is expected to grow by over five percent, resulting in 900 annual job openings. The current median salary for atmospheric and space scientists in Florida is $77,501.

Natural sciences manager positions are projected to grow by over seven percent nationally through 2033, with 8,300 annual job openings. Currently, the workforce demand in Florida is not available for this occupation. While the minimum education requirement is a bachelor’s degree plus five years of experience (according to the Bureau of Labor Statistics), Ph.D. graduates will be well-prepared for leadership roles in planetary and space sciences research and management. The current national median salary for natural sciences managers is $86,300.

The demand for postsecondary faculty in atmospheric, earth, and space sciences is projected to grow by just over three percent in Florida by 2032 and by nearly 4% nationally by 2033. The current median salary for postsecondary faculty in atmospheric, earth, and space sciences nationally is $97,770.

Board staff conducted an independent search on Indeed.com and LinkedIn for job openings in planetary and space sciences requiring a Ph.D., using keywords such as astronomy, planetary science, space research, atmospheric science, and earth sciences faculty. The search identified 17 current Florida job openings within the public and private sectors. The job titles include research physicist, research scientist (physics) specializing in AI training, lead space science educator, and assistant scientist in astronomical space-based technology. Typical employers include the National Aeronautics and Space Administration (NASA), Zel Technologies, the Museum of Science and Industry, and research universities such as the University of Florida.

Graduates from the Physics Ph.D. program in the Planetary and Space Sciences track have secured roles at governmental agencies, including NASA, in positions such as Planetary Science Project Scientist and Aerospace Technologist: Flight Vehicle Space Environments. One graduate holds a leadership role in research and development for the Southwest Research Institute, and another works as an associate research scientist for the Planetary Science Institute. These achievements highlight the program's success in preparing graduates for impactful careers in planetary and space sciences.

Table 3: Labor Market Demand, CIP Code 40.0203

Occupations	% Change in Job Openings		Annual Average Job Openings		Total # of New Jobs		Education Level Needed for Entry
	FL 2024-32	U.S. 2023-33	FL 2024-32	U.S. 2023-33	FL 2024-32	U.S. 2023-33	
Astronomers 19-2011	NOT AVAILABLE	7.4%	NOT AVAILABLE	200	NOT AVAILABLE	200	Doctoral or professional degree
Atmospheric & Space Scientists 19-2021	11.7%	5.6%	90	900	108	600	Bachelor's degree
Atmospheric, Earth, & Space Sciences Faculty 25-1051	3.2%	3.8%	77	1,100	30	500	Doctoral or professional degree
Natural Sciences Managers 11-9121	NOT AVAILABLE	7.5%	NOT AVAILABLE	8,300	NOT AVAILABLE	7,500	Bachelor's degree

Sources: U.S. Bureau of Labor Statistics and Florida Department of Commerce. Date Retrieved: 3/10/2025.

Support from Industry Partners

The letters of support for the proposed Ph.D. in Planetary and Space Sciences highlight its role in addressing the growing needs of the space science industry. Industry partners, including NASA, the International Space Station National Laboratory, and Redwire, provided letters expressing strong support for the program. The letters emphasized the program's potential to drive innovation, develop a skilled workforce for the space sector, and advance research that aligns with national space exploration priorities.

Several of the letters noted that graduates from the program would be ideally positioned to contribute to their organizations. Partners identified projects such as Additive Manufacturing for Space Exploration and Advanced Computing and Communications as areas that graduates could support in their organizations. The letters also noted opportunities for providing students with practical experience, mentorship, and collaboration on joint proposals.

Student Demand and Projected Enrollment

The University of Central Florida projects student interest in the proposed program based on the annual enrollments in the existing track. For the 2024-2025 Academic Year, 31 graduate students are enrolled in the planetary science track, including 29 Ph.D. students and two students in the master's program.

The University of Central Florida anticipates enrolling 33 students in Year 1, with a projected enrollment of 50 students in Year 5, as shown in Table 4.

Table 4: Projected Total Student Enrollment

Implementation Year	Proposed Student Headcount
Year 1	33
Year 2	36
Year 3	40
Year 4	45
Year 5	50

Source: University of Central Florida Ph.D. in Planetary and Space Sciences Proposal

Alignment with Institutional and System Strategic Priorities

The proposed program aligns with UCF's mission by educating students in an area of national strategic interest and providing them with practical experiences and opportunities throughout their education. "Space Technologies and Systems" is the first focus area in the UCF strategic plan, and this proposed program would broaden and strengthen a productive degree track that has been in place for the past 15 years. The program and its graduates will help expand research and innovation in strategic local and national interest areas.

Additionally, the Florida Space Institute is located at the University of Central Florida and includes researchers and educators from the universities in the State University System. The multidisciplinary research and development institute is dedicated to advancing space science and exploration through research, development, education, and collaboration.

The proposed Ph.D. aligns with the SUS 30 Strategic Plan goals, supporting research and economic development and producing world-class graduates. The program will help address Florida's workforce needs in the space industry.

Faculty

There are 19 existing faculty members from the Planetary and Space Sciences track within the Physics Ph.D. program that will participate in the proposed program. Additionally, there will be two new hires who will contribute to the program beginning in fall 2025. The proposal included multiple examples showing that the faculty associated with the program has the experience and research capacity to sustain the program, with over $43 million in external grant funding secured between Fiscal Years 2020 and 2024.

Resources

According to the proposal, the university has sufficient resources to implement the proposed program, as they already have multiple research laboratories, an observatory with an advanced telescope, and a machine shop for hardware development. The university also documented that sufficient library and physical resources would be available to sustain the program through five years.

The University of Central Florida plans to support the proposed program with graduate student fellowships and assistantships. Graduate students in the planetary sciences track at UCF have been awarded fellowships, including NASA's Future Investigators in NASA Earth and Space Science and Technology, the UCF Trustees Doctoral Fellowship, and the Presidential Doctoral Fellowship. Approximately 75 percent of students on the current track secure graduate research assistantships funded by external grants, and approximately 25 percent receive graduate teaching assistantships from the physics department budget.

Estimate of Investment

The proposed program will be funded through contracts and grants (C&G) and Education and General (E&G) funds reallocated from the existing planetary sciences track within the physics Ph.D. program. As shown in Table 5, UCF intends to expend $1,149,948 in Year 1 and $1,715,640 in Year 5.

The program will charge students the standard approved graduate tuition rates, currently $369.65 per credit hour for resident students and $1,194.05 for non-resident students.

Table 5: Projected Program Costs and Funding

Total Costs		Source of Funding		Cost per FTE
		E&G	C&G	
Year 1	$1,149,948	$127,500	$1,022,448	$7,727
Year 5	$1,715,640	$155,000	$1,560,640	$6,200

Source: University of Central Florida Ph.D. in Planetary and Space Sciences Proposal

Conclusion and Board Staff Comments

If approved, the proposed Ph.D. in Planetary and Space Sciences will be the first program in the System offered in CIP 40.0203. The proposed program aligns with the Board of Governors' 2030 Strategic Plan by supporting research and economic development and producing world-class graduates. The university provided sufficient evidence to demonstrate the workforce needs for graduates at the doctoral level. In addition, the university has faculty, physical resources, and funding to implement and sustain the program for five years. Board staff has no concerns regarding the proposed program.

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