

Entry #: 61 - Mathematics, Science and Engineering

Status: Submitted

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**DRAFT****OVERVIEW OF PROGRAM REVIEW AND PLANNING FOR INSTRUCTIONAL PROGRAMS**

Program Review and Planning is about evaluating and assessing programs and documenting plans for improving student success rates. Through review of and reflection on key program elements, Program Review and Planning identifies program strengths and strategies necessary to improve the academic discipline, program, and/or services to support student success.

The College also uses Program Review and Planning as the conduit to request resources (human, technology, facilities and funding) to further help improve and support programs.

**ALL PROGRAMS WILL COMPLETE AN ANNUAL PROGRAM REVIEW FOR 2023-2024.**

**BASIC PROGRAM INFORMATION****Division Name**

Mathematics, Science and Engineering

**Department Name**

Earth, Space, and Environmental Sciences

**Microsoft\_List\_ID****Discipline Name**

Earth Sciences (ES)

**Department Chair Name**

Catherine Jain

**Department Chair email**

cjain@palomar.edu

**Please list the names and positions of everyone who helped to complete this document.**

Nina Shmorhun, Assistant Professor, Earth Science (Oceanography/Geology)

Sean Figg, Professor, Geology

Jonathan Sleeper, Assistant Professor, Earth Science (Oceanography/Geology)

**Website address for your discipline**<https://www.palomar.edu/earthscience/>**Discipline Mission statement**

The Geoscience (Geology and Oceanography) program offers students the opportunity to study the dynamic processes and interconnections that affect Earth's geologic and oceanographic systems. Further, the program seeks to help students develop an understanding how geologic and oceanic systems, hazards, and resources influence on humans as well as their impact on the environment.

[\(Click here for information on how to create a mission statement.\)](#)

**Does your discipline have at least one degree or certificate associated with it?**

Yes

**Are any of your programs TOP coded as vocational (CTE/CE)?**

No

**List all degrees and certificates offered within this discipline.**

A.S. Geology, A.D.T. Geology

**BASIC PROGRAM INFORMATION: FACULTY AND STAFFING RESOURCES**

In this section, you will identify how many faculty and staff support your discipline's programs. This information is considered when you request permanent staff and faculty hires. It is also useful as you evaluate your program and the human resources and talent you have to support our students.

To help you answer questions in this section, you will need the links shown in red.

**Enter the number of permanent or full-time faculty support your discipline (program)?**

3

**For this past fall semester, what was your Full-time FTEF assigned to teach classes?**

3.0 (OCN = 1.60; GEOL = 1.40)

**For this past fall semester, what was your Part-time FTEF assigned to teach classes? (Part-time FTEF = PT hourly and overload.)**

0.60 (OCN = 0.40; GEOL = 0.20)

**List the classified and other permanent staff positions that support this discipline. If possible, include number of months and percentage workload.**

None

**List additional hourly staff that support this discipline and/or department. Include weekly hours.**

Stephen Corey (15hrs/week); Stephen is transitioning to another position in Spring 2024.

Randy Parker (10hrs/week); Randy is transitioning to 30hr/week to the Physics Department.

**COURSE INFORMATION**

In this section, you will review how students perform in the courses you offer as part of your program. The Chancellor's Office Vision for Success goals focus on eliminating equity gaps and increasing timely completions. Examining, reflecting upon, and developing strategies to improve course success rates is one way to help the college meet its Vision for Success Goals and support our students in reaching theirs.

Data are provided to help you examine differences in course success rates (C or better) across student demographic categories (e.g., gender) and course type (e.g., face-to-face, online).

After you complete your review of course success data, you are asked to confirm that you have assessed each course SLO within the past three years.

[Link: Course Data](#)

**COURSE SUCCESS AND RETENTION****Have your overall course success rates increased, decreased, or stayed the same over the last 5 years?**

Increased

**Was this expected? Please explain.**

Increased (recent), Stayed the same (past 5 years)

GEOL: Increased

OCN: Increased (recent)

Reason: Even though enrollment has decreased due to reduction in number of sections offered (OCN and GEOL both affected), success rates have increased over the past several years (GEOL: 67% to 85%; OCN: 70% to 75%). With the hiring of additional faculty (2 full-time), success rates have likely increased. Success rates meet or exceed institutional standards.

**Have your overall course retention rates increased, decreased, or stayed the same over the last 5 years?**

Stayed the same

**Was this expected? Please explain.**

Increased (recent), Stayed the same (past 5 years)

GEOL: Stayed the same

OCN: Increased (recent)

Reason: Even though enrollment has decreased due to reduction in number of sections offered (OCN and GEOL both affected), retention rates have remained relatively the same over the past several years (GEOL: 94%; OCN: 92%). With the hiring of additional faculty (2 full-time), retention rates have likely increased. Retention rates meet or exceed institutional standards.

**Are there differences in success or retention rates in the following groups? (choose all that apply)****Please share methods that your department is using to improve retention and success rates in your courses. If you are focusing on a specific group like online students or a demographic group please include that information in your answer.**

For both Oceanography and Geology courses, there has been an overall increase in success and retention from most groups listed above. For example, from Spring 2022 (prior to the hiring of 2 new full-time faculty members) to Spring 2023, the following trends were seen for success rates: 1) OCN saw an overall increase (1%-15%) in age, race/ethnicity, gender, and veteran status demographic groups; 2) GEOL saw. Similar trends were seen for enrollment rates.

Creating effective teaching strategies requires us to critically analyze our work in-and out of the classroom, make data-driven decisions, and collaboratively create DEIAA strategies. The three Earth Science faculty members (Sean Figg, Nina Shmorhun, and Jonathan Sleeper) work together to address DEIAA issues which is an ongoing need, especially in STEM fields. They work together to foster collaborative, transformative, and student-centered classroom settings. The increase in success and retention amongst various student demographic groups, especially over the course of 1 academic year, is likely attributed to this ongoing work and revitalization and DEIAA-driven Earth Science (Geology/Oceanography) program.

**COURSE STUDENT LEARNING OUTCOMES (SLOs)****Excluding courses that haven't been offered in the last three years, do you confirm that all of your courses have been assessed since August 2020 (Result Summary Date)?**

Yes

**Upload a copy of your SLO report from Nuventive ("Report 0. Last Result Date and Action Date for All Active Course Outcomes")**

[Course SLO Report\\_ Last Result Date and Action Date for All Active Course Outcomes\\_EarthScience\\_GEOL\\_OCN.xls](#)

30 KB

**PROGRAM INFORMATION**

In this section, you are asked to consider and evaluate your programs, including the annual number of completions, and their program learning outcomes,

## PROGRAM COMPLETIONS

Student success is at the core of what we do in assisting students in achieving their goals.

The Chancellor's Office Vision for Success stresses the importance of Program Completion as a major goal for our students. In addition, transfer and career readiness are key components of Palomar College's mission statement.

Link: [Program Completions](#)

**Access the link above titled "Program Completions" and copy and paste five years of completion data for each of your discipline's degrees and certificates.**

Degrees and Certificates Awarded (Count)  
Academic Year AT APD Student Count Column Labels  
Row Labels 2017-18 2018-19 2019-20 2020-21 2021-22  
AA/AS  
Associate in Science Degree 1 1 2  
Associate in Science Degree for Transfer 1 2 2 1 1  
AA/AS Total 2 3 2 3 1  
Grand Total 2 3 2 3 1

Copy and Paste Data Format for PRP  
Degrees and Certificates Awarded (Count)  
Academic Year AT APD Student Count Column Labels  
Row Labels 2017-18 2018-19 2019-20 2020-21 2021-22  
AA/AS  
Associate in Science Degree 1 1 2  
Associate in Science Degree for Transfer 1 2 2 1 1  
AA/AS Total 2 3 2 3 1  
Grand Total 2 3 2 3 1

## PROGRAM LEARNING OUTCOMES

**Do you confirm that all of your programs have been assessed since August 2020 (Result Summary Date)?**

Yes

**Upload a copy of your SLO report from Nuventive ("Report 2. Last result, action, and follow-up date for each active program outcome").**



[2. Last Result, Action, and Follow-up Date for Each Active Course Outcome\\_EarthScience\\_OCN\\_GEOL.xls](#)  
28.5 KB



## Program Review Reflection and Summary

In this section you are asked to evaluate your programs by considering their program learning outcome assessments, the annual number of completions, and any other internal or external factors that had an impact on your program.

### What factors have contributed to the success of your program(s)? Describe how they have contributed.

The Geoscience (Geology and Oceanography) program continues to be a popular physical science option for general education students. It continues to see consistency in the number of declared majors and degrees obtained, specifically in student transfer rates to four-year universities. Oceanography now has two full-time faculty who generate increased interest in the program. The program is also seeing an increase in historically underrepresented students becoming Geoscience majors. Oceanography has implemented a no-cost lab manual created by Palomar Faculty, Geology is working on a similar option.

### What factors have presented challenges for your program(s)? Describe the impact of these challenges.

Lack of full-time faculty in Oceanography presented a challenge until 2023-2024 academic year. Difficulties enrolling in our courses, especially field courses, has created challenges and caused a few students to finish their Geoscience education elsewhere. Issues and difficulty with technology resources has created challenges using Geoscience applications and programs. The lack of a full time ADA, and ISA has also impacted the efficiency of our program and planning.

## CAREER AND LABOR MARKET DATA

The Chancellor's Office Vision for Success stresses the importance of increasing the percent of exiting students who report being employed in their field of study. It is important for us to consider how **all** of our programs connect to future careers.

Go to this website <https://www.onetonline.org/> and enter your discipline in the bubble on the top right for ideas about potential occupations. Click on an example to see more detail.

### The following websites are for CTE related data:

- [Centers of Excellence](#) (many other data resources besides supply and demand) Password: GetLMI
- [LaunchBoard](#)
- [LaunchBoard Resource Library](#)
- [Chancellor's Office Data Mart](#)
- [Career Coach-San Diego Workforce Partnership](#)
- [EDD Labor Market Info](#)
- [Career One Stop](#)

### What kinds of careers are available for people who complete your programs (and/or transfer)? (Refer to O\*net Link below) Are there any new or emerging careers? If so, how would the new or emerging careers impact your future planning?

Atmospheric, Earth, Marine, Space Sciences, and Geography Teachers, Postsecondary  
Atmospheric and Space Scientists  
Geoscientists, Except Hydrologists and Geographers  
Life, Physical, and Social Science Technicians, All Other  
Geological Technicians  
Mining and Geological Engineers, including Mining Safety Engineers  
Hydrologists  
Natural Sciences Managers  
Environmental Scientists and Specialists, including Health  
Architectural and Engineering Managers  
Civil Engineers  
Architectural and Civil Drafters  
Environmental Science

Earth Drillers  
Environmental Restoration Planners  
Explosives Workers, Ordnance Handling Experts, and Blasters  
Remote Sensing Scientists and Technologists

Nationally, the U.S. Bureau of Labor Statistics (BLS) projects employment in the Geosciences to grow at least 5-7% over the next decade (2022-2032), surpassing the average for all professions.

For San Diego specifically, the region is designated as a "Blue Tech" or Ocean Tech cluster. Blue Tech jobs include technologically advanced activities and methods used to solve water-related issues as well as traditional maritime jobs. Students interested in pursuing a Blue Tech career would be encouraged to pursue coursework in additional science-related fields (e.g., computer science, cybersecurity). Several Geologic careers show an increase in demand, including Hydrology, Post-Secondary Educators, and Oil/Gas Extraction.

Remote sensing is a growing career in the Geosciences (Oceanography and Geology). Developments in technology are replacing aspects of traditional fieldwork. Palomar College has a well-established GIS program that includes a remote sensing class. All Geoscience students are encouraged to take GIS classes as it is a highly desirable skill for Geology and Oceanography professions.



**What are the associated knowledge, skills, abilities (KSA's) needed for the occupations listed above? (click examples in the link above to get ideas)**

The KSA's needed for employment in any of the above fields align with introductory geological and oceanographic (geoscience) knowledge, as well as general scientific skills and abilities. Further, most Geoscience jobs require a four-year bachelor's degree, some also require an advanced degree (M.S. or Ph.D).

More specifically, knowledge needed includes:

Science  
Education and Training  
English Language  
Mathematics  
Computers and Electronics  
Physics  
Chemistry  
Geology  
Biology

Skills needed include:

Problem Solving Using Scientific Principles  
Speaking  
Reading Comprehension  
Instructing  
Active Listening  
Oral Expression/Communication  
Technology Skills (e.g., analytical/scientific software, GIS, image scanning software, knowledge of computers)

Abilities needed include:

Inductive Reasoning  
Problem Sensitivity  
Information Ordering  
Oral Expression  
Speech Clarity  
Oral Comprehension  
Written Comprehension  
Deductive Reasoning  
Data and Spatial Analysis

**How does your program help students build these KSA's?**

By completing courses in Geosciences (Geology and Oceanography) at Palomar College, successful students have a basic background in science and fundamental concepts/skills to enable them to continue their education at other 4-year institutions or enter directly into the workforce. Many of these KSA's are fundamental items (Problem Solving Using Scientific Skills, English Language, Speech Clarity, Reading Comprehension, Written Comprehension, Reasoning) that a student learns and meets in our Geology and Oceanography courses.

Our program is designed so that each course builds upon its predecessor. For example, geologic mapping skills are introduced at the 100 level (GEOL 100); students must interpret symbols and structures on a map. The next course (GEOL 150) guides students through making a geologic map and stratigraphic column from given data sets. During the field studies course (GEOL 195), geology majors use geologic tools and skills to measure and relate their findings to a professionally published geologic map.

The following four questions are for CTE programs only. If you are not a CTE program, please go back to the BASIC INFORMATION tab and select "no" for "Are any of your programs TOP coded as vocational (CTE/CE)?"

## PROGRAM GOALS

### Progress on Prior PRP Goals

In the most recent PRP cycle, you identified a set of goals. Provide an update to your most recent PRP goals.

[Click here for previous PRPs with goal information.](#)

### Prior PRP Goals

#### Prior Year PRP Goal 1

##### Brief Description

The merger of the Oceanography and Geology programs.

##### Goal Status

Ongoing

**Add any comments related to your work on prior goal (e.g., success, challenges, reasons for eliminating a goal). Describe Outcomes, if any.**

In 2020 the California Community College's Chancellor's office combined the programs of geology and oceanography under the Earth Science umbrella. Oceanography alone does not lead to an undergraduate degree or certificate, as it is traditionally a Master's or Ph.D. study area. Oceanography is an elective of Geology A.S and ADT degree pathways. The ESES department chair initiated a discussion with the Dean of the Math, Science, and Engineering (MSE) about combining the Oceanography and Geology programs.

However, most recently with the implementation of AB928 (Cal-GETC standard updates) and AB1111 (Common Course Numbering), we will have to further adjust based on the California Community College System to stay in alignment with incoming implementations of assembly bills. The ESES department will follow the necessary steps outlined by the administration to combine the Geology and Oceanography programs.

#### Prior Year PRP Goal 2

##### Brief Description

Increase Degree Completion Rates

##### Goal Status

Ongoing

**Add any comments related to your work on prior goal (e.g., success, challenges, reasons for eliminating a goal). Describe Outcomes, if any.**

Most students pursue the Geology A.S.-T degree but transfer before degree completion. Geology students are directed to the Palomar Program Mapper to help increase the efficiency that students are completing a geology degree. Assistance and collaboration with the counseling department will be essential in guiding students through the geology program. The geology program will take a more active role in graduation application advertisements, ensuring geology majors are aware of the graduation deadlines.



**Prior Year PRP Goal 3****Brief Description**

Increase Enrollment in GEOL 110 and 150

**Goal Status**

Ongoing

**Add any comments related to your work on prior goal (e.g., success, challenges, reasons for eliminating a goal). Describe Outcomes, if any.**

The geology program plans to increase marketing for the lower enrollment courses such as GEOL 110 Geology of Natural Parks and GEOL 150 Dinosaur and Earth History. The program will consult with creative services about banners and flyers to advertise the courses. GEOL 110 has completed the requirements to be continually offered as distance education (DE). In spring 2023, GEOL 110 had a 100% fill rate and high retention. The geology program is hopeful online sections of GEOL 110 will fill the next time the course is offered.

In Spring 2023, GEOL150 was moved to 11:10 am on Tuesdays and Thursdays. When offered in a morning time slot in spring 2021, the course saw an enrollment increase of ten students. The program is hopeful enrollment will increase with an increase in the course advertisement.

**Describe any changes to your goals or three-year plan as a result of this annual update.**

The development, modification, and updating of the in-person and virtual course material for students, such as implementing zero-cost lab manuals.

**Do you have any new goals you would like to add?**

Yes

**Establishing New Goals and Strategies for the Next Three Years****Goal 1****Brief Description**

Increase undergraduate transfer, research, and workforce pathways for Community College student to four-year Universities.

**How will you complete this goal? Include Strategies and Timeline for Implementation.**

Year 1- Obtain the XRF machine from Scripps Institute of Oceanography (SIO) and develop classroom-based research projects.

Year 2- Write grants to create pathways to Geology/Oceanography programs and develop research projects.

Year 3- Develop a new course to align with AB928, AB1111, Palomar College EVP 2035, and the CCC Vision 2030.

**Outcome(s) expected (qualitative/quantitative)**

This goal will provide Palomar Community College students (including dual enrollment) access to high-level scientific laboratory equipment usually reserved for research universities. An increase in program retention and success rates. Advanced preparation for research and workforce positions. Opportunities for collaboration with both two-year and four-year institutions, along with cross-departmental projects. Support Palomar College outreach services and summer programs, providing engaging laboratory demonstrations for K12 and on-campus tours. Potential for revenue and internship through partnerships with local businesses, consultants, organizations, and conservancies.

**How does this goal align with your department mission statement, the college Vision Plan 2035, and /or Guided Pathways?**

The Department of Earth, Space, and Environmental Sciences (ESES) is committed to cultivating spaces that support academic excellence at Palomar College. It is our responsibility to ensure each student has equitable access to opportunities for study, research, mentorship, and intellectual exploration and growth. We strive to contribute to Palomar College's mission to prepare students to engage with local and global communities.

**Expected Goal Completion Date**

8/15/2027

## RESOURCES

Congratulations! You are nearing completion. In this section, you will consider the resources you need to implement your three-year program review plan and/or address any findings from your assessment of your discipline.

The section is organized into the following five parts:

PART 1: Staffing Needs (Faculty and Additional Staff)

PART 2: Budget Review

PART 3: Technology Needs

PART 4: Facilities Needs

PART 5: One Time Request for Other Needs (NonTechnology Equipment, Supplies, Operating Expenses, Travel)

Reflect upon the three year plan you created above, your current operations, and any upcoming factors (retirements, changes in legislation, and changes in policies or procedures) that will impact your unit. How will you allocate resources to implement your plan? Describe additional resources needed to improve the effectiveness of your unit/program. All resource requests must be aligned with the College's [Vision Plan 2035](#).

Summarize any reallocation/re-organization of resources you are making based upon your three-year plan, your current operations, and any other factors (e.g., legislation). Describe the impact of the reallocation of resources to your unit.

**NOTE: All requests listed in the PRP will be reviewed by deans and supervisors, then forwarded to the appropriate review group for prioritization. A resource requests approved to move forward in the review process does NOT guarantee a position or funding.**

## PART 1: STAFFING NEEDS

Requests for faculty will follow the prioritization process currently in place in the Faculty Position Prioritization committee, which reports to the Education, Equity, and Student Success Council. Requests for new staff positions will be prioritized at the division level and reviewed at Exec.

**Are you requesting additional full-time faculty?**

No

### REQUEST FOR ADDITIONAL FULL-TIME FACULTY

**Are you requesting AA, CAST for Classified Staff?**

Yes

### REQUEST FOR ADDITIONAL CLASSIFIED, CAST, AA

#### Staff, CAST, AA request 1

**This year, units are asked to identify new positions only as part of the PRP process. Vacant positions will be addressed outside of the PRP process.**

If you are requesting STAFF, please fully complete this section. If not, you can skip to the next resource section. Click "+Add Staff, CAST, AA request" below for each additional request.

When considering the funds required for a position, consult the HR website for position salary schedule and the [Benefits Worksheet](#) for additional costs related to benefits for the position.

#### Title of new position

Academic Department Assistant (ADA), ESES

**Is the position request for AA, CAST, or Classified staff?**

Classified

**Is this request for a full-time or part-time position?**

Full Time

**How does the position fill a critical need for current, future, or critical operations?( e.g. accreditation, health and safety, regulatory, legal mandates, institutional priorities, program trend analyses of growth/stability.)**

The Department of ESES lost their full-time ADA (shared with Physics and Chemistry) in the Fall of 2023. Since then, we have received part-time support from Stephen Corey (15 hours/week), but Stephen may transition to a new position in Spring 2024. We will no longer have ADA support moving forward, and are in need of a full-time ADA to support our Department with institutional priorities, program trend analyses of growth/stability, and overall Department functionings.

**Does the position assist in establishing more efficient District operations through either of the following: reorganization/restructuring OR use of technology?**

The position would help establish more efficient district operations through reorganization/restructuring of Divisions, particularly in MSE.

**Is there funding that can help support the position outside of general funds?**

No

**Describe how this position helps implement or support your three-year PRP plan.**

**Educational Vision Plan 2035 Objective**

2:2	2:4	2:7
2:3	2:6	5:2

**If the position is not moved forward for prioritization, how will you address this need?**

Currently, our Department does not have full-time ADA support. Full-time faculty must lean on Part-Time support and ADA's from neighboring Departments (Chemistry, Dean MSE ADA). With the hiring of a Department ADA, full-time faculty will be more involved in student department, and institutional activities, thus enhancing productivity and the efficiency of programs and course offerings. Most recently, the Oceanography and Geology (Earth Science) faculty were tasked with expanding programs to Palomar's Educational Centers (Rancho Bernardo, Escondido, and Fallbrook), which requires the attention of full-time faculty. If College/District plans include this goal, then support and allocation of resources must be provided for hiring a full-time ADA to replace our previous full-time ADA.

**Staff, CAST, AA request 2**

**This year, units are asked to identify new positions only as part of the PRP process. Vacant positions will be addressed outside of the PRP process.**

If you are requesting STAFF, please fully complete this section. If not, you can skip to the next resource section. Click "+Add Staff, CAST, AA request" below for each additional request.

When considering the funds required for a position, consult the HR website for position salary schedule and the [Benefits Worksheet](#) for additional costs related to benefits for the position.

**Title of new position**

Instructional Support Assistant (ISA), ESES

**Is the position request for AA, CAST, or Classified staff?**

Classified

**Is this request for a full-time or part-time position?**

Full Time

**How does the position fill a critical need for current, future, or critical operations?( e.g. accreditation, health and safety, regulatory, legal mandates, institutional priorities, program trend analyses of growth/stability.)**

The Department of ESES lost their full-time ISA in the Fall of 2023. We are in need of a full-time ISA to support our Department with institutional priorities, program trend analyses of growth/stability, and overall Department functionings.

**Does the position assist in establishing more efficient District operations through either of the following: reorganization/restructuring OR use of technology?**

The position would help establish more efficient district operations through use of technology, particularly in the MSE Division.

**Is there funding that can help support the position outside of general funds?**

No

**Describe how this position helps implement or support your three-year PRP plan.**

**Educational Vision Plan 2035 Objective**

1:3	1:11	3:5	4:4
1:4	2:6	3:7	4:5
1:7	2:7	4:2	4:6
1:10	3:1	4:3	

**If the position is not moved forward for prioritization, how will you address this need?**

**PART 2: BUDGET REVIEW**

Request that your ADA provide you with your *Available Budget Report* and complete this section.

Review your recent Budget/Expenditure reports and consider your three-year PRP plan.

**Do you have any ongoing needs or needs to augment your regular budget?**

No

**PARTS 3, 4 and 5 – TECHNOLOGY, FACILITIES AND OTHER NEEDS**

1.One-Time Fund Requests. Through the PRP process the college implements an approach for prioritizing and allocating one-time needs/requests. Prioritization takes place through the appropriate groups, leadership, and the Budget Committee. The executive team and Resource Allocation Committee consider various sources for funding PRP requests. Resource requests also inform the larger planning process like Scheduled Maintenance Plans, Staffing Plans, and institutional strategic planning.

For more information about funding sources available, see [IELM BLOCK GRANT, LOTTERY, PERKINS AND STRONG WORKFORCE GUIDELINES](#) (on the left menu of the webpage).

If you are a CTE program and think you may qualify for CTE funds for your PRP request(s), you are STRONGLY encouraged to answer the call for Perkins/Strong Workforce grant applications in February. Contact the Dean of CTEE for additional information.

Consider submitting one-time requests only if you have verified that you cannot fund the request using your general discretionary funds or other funds.

1.Technology and Facilities Review. Requests for technology and facilities are assessed by the Deans and then, if appropriate forwarded to the proper institutional group (e.g., technology review committee, or facilities) for review and feedback.

**PART 3: TECHNOLOGY NEEDS**

**Will you be requesting any technology (hardware/software) this upcoming year?**

Yes

**Technology Request****Technology Request 1**

**What are you requesting?**

Scripps Institute of Oceanography (SIO) Geological Collections recently received funding to purchase a new XRF (X-Ray Fluorescence) Machine and has offered Palomar College's Earth Science (Oceanography/Geology) program their previous XRF machine (manufactured by AvaTech Analytical Solutions in the Netherlands). The XRF machine is used to determine the chemical composition of any non-living material (e.g., sediments, rocks, dead tissue, plants). Additionally, the XRF machine can also take detailed pictures of the material analyzed. Skills gained from this machine are highly sought after in the workforce (public and private industry) and for transfer into four-year universities. The XRF is easy to operate and needs very limited maintenance. Because of this, the XRF machine can be used by both Faculty and Students (under faculty supervision) after short trainings.

Currently, the machine is sitting at SIO's Geological Collections Laboratory and needs to be moved to Palomar College's Natural Sciences Building on the San Marcos Campus.

**Is this a request to replace technology or is it a request for new technology?**

New Technology

**Provide a detailed description of the the request. Include in your response:****a. Description of the need? (e.g., SLO/SAO Assessment, PRP data analysis)**

As mentioned in Section 4 (Career and Labor Market Data) of this annual PRP, employment in the Geosciences (Geology and Oceanography) professions are expected to grow at rates of 5-7% over the next decade (2022-2032). Effectively preparing Palomar students to enter into the workforce or successfully transferring to a four-year University is dependent on the classroom and laboratory experiences we can provide students. As of now, our program is limited to the technology and supplies we currently have, but are not aligned with the growing needs of the Geoscience field. The use of the XRF would be a full implementation of common research and geotechnical skills. Obtaining and regular operation of this XRF would ultimately fulfill our ongoing needs and keep us aligned with Palomar College's Educational Vision Plan 2035.

**b. Who will be impacted by its implementation? (e.g., individual, groups, members of department)**

Palomar Earth Science faculty have been in regular communication with the SIO Geological Collections Manager and SIO Faculty about developing a strong transfer pathway from Palomar College to SIO/UCSD for our Earth Science students. SIO is in full support of having Palomar College students support with analyzing samples that are backlogged in SIO's extensive Geological Collections. Students would directly analyze samples using the newly acquired XRF machine from SIO. Providing unique and applicable laboratory/research opportunities would align with our desire to provide students with immersive and skill-building experiences in- and out of the classroom setting. Additionally, Earth Science faculty would gain expert knowledge to support with routine analysis of material for whomever would want to fully determine the chemical composition of any non-living material. The XRF machine can be applied to courses and research outside of the ESES Department, including Chemistry, Biology, and similar programs.



**c. What are the expected outcomes or impacts of implementation?**

Major impacts would include Palomar College Faculty and Students, as well as community partners. Palomar College Faculty (including other MSE Faculty, neighboring Community College and four-year University Faculty) could use the XRF machine for their courses (lecture and laboratory) and/or for research purposes. Palomar College Students could use the XRF machine as part of their courses (e.g., GEOL 100/100L, OCN 100/100L, GEOL 110/150), for directed study courses (e.g., OCN 295, GEOL 295), summer internships, student-led clubs, grant-funded research, or similar. Community partners would also be impacted by the implementation of the XRF as it could be used by anyone wanting to understand the chemical composition of non-living material (e.g., local industry partners, and conservation organizations)—including a potential revenue source.

In addition, the implementation of this XRF machine would support with Palomar College's EVP 2035 Goals of increasing enrollment rates, strengthening external partnerships/community relationships, establishing unique programs to serve our student population, reimagining instruction, and further investing in our people/processes.

**d. Timeline of implementation**

Currently, the XRF machine is sitting at SIO and needs to be moved in a timely manner. Professor Shmorhun has been in regular communication with the SIO Geological Collections Manager and they are aware that implementation of the XRF at Palomar College is contingent on funding and the ability to move the machine. Ultimately, SIO would like Palomar College to have the XRF as it would support with our current transfer pathway plans between SIO and Palomar College.

**What is the anticipated cost for this request? If any, list ongoing costs for the technology (licenses, support, maintenance, etc.).**

SIO is not requesting any monetary compensation for the machine, but funding will be needed for the following:

Avaatech Technician to uninstall the XRF at SIO and getting it ready to transport via truck to Palomar College (~40min away) and proper installation of the XRF at Palomar College: \$11,000 euros (including travel costs for Avaatech staff who live in the Netherlands)

Training by Avaatech staff for Palomar Faculty and Students to use the XRF: \$10,000

New X-ray tube (will last for 20+ years): \$18,000

Installation of X-ray tube: \$6,000

Helium Tanks: \$1,000

XRF supplies: \$3,000

5-year Maintenance Costs: \$2,000

Hiring a company to transport/haul the XRF Machine: \$5,000 (cost could be much lower if Palomar College warehouse transports)

It is noted that Avaatech Staff live in the Netherlands, therefore a majority of the costs listed above include travel and labor costs. Avaatech Staff presented 3 separate quotes, but could feasibly do all of the above in 1 trip. Therefore, saving approximately \$8,000+ from the costs requested above. Above costs are dependent on overall travel and boarding costs of Avaatech Staff.

**Do you already have a budget for this request?**

No

**What PRP plan goal/objective does this request align with?**

Goals 1, 2, and 3

**What Educational Vision Plan 2035 Goal/Objective does this request align with?**

1:4	2:2	3:5	4:5
1:5	2:4	3:8	4:6
1:6	2:6	4:1	4:7
1:7	2:7	4:2	
1:10	3:1	4:3	
1:11	3:2	4:4	

**If you have multiple requests for technology and had to prioritize, what number would you give this? (1 = Highest)**

1

**What impacts will this request have on the facilities/institution (e.g., water/electrical/ADA compliance, changes to a facility)?**

Moving/Removal of current equipment housed in ESES Department to accommodate XRF machine, (potential) widening of a doorway to fit XRF machine, hooking up of helium tanks.

**Will you accept partial funding?**

No

**PART 4: FACILITIES REQUESTS****Do you have resource needs that require physical space or modification to physical space?**

Yes

**Facilities Requests****Facility Request 1****What are you requesting?**

Widening of doorway for NS-119 to accommodate the XRF machine requested in Part 3 (Technology Needs), above. The current door is a single doorway, we are requesting it be a double door-way frame (6-foot wide doorframe) to accommodate and maneuver an ~3-foot wide/11-foot long XRF machine. Installation of a helium tank mount.

NS-119 was previously used by our ESES ISA (Tony Kopec, now retired) and currently houses unused machinery. Current plans are to remove the machinery and replace with the XRF in this space and for additional ESES Department storage. It is noted that the current machinery in NS-119 cannot be used by anyone in the NS-building and are currently too big to be removed (unless machinery is completely dismantled). Widening of the doorframe would allow for easy removal as CTE has requested the machinery currently housed in NS-119.

**Provide a detailed description of the the request. Include in your response:**

**a. Description of the need? (e.g., SLO/SAO Assessment, PRP data analysis)**

As mentioned in Section 4 (Career and Labor Market Data) of this annual PRP, employment in the Geosciences (Geology and Oceanography) professions are expected to grow at rates of 5-7% over the next decade (2022-2032). Effectively preparing Palomar students to enter into the workforce or successfully transferring to a four-year University is dependent on the classroom and laboratory experiences we can provide students. As of now, our program is limited to the technology and supplies we currently have, but are not aligned with the growing needs of the Geoscience field. The use of the XRF would be a full implementation of common research and geotechnical skills. Obtaining and regular operation of this XRF would ultimately fulfill our ongoing needs and keep us aligned with Palomar College's Educational Vision Plan 2035.

**b. Who will be impacted by its implementation? (e.g., individual, groups, members of department)**

Palomar Earth Science faculty have been in regular communication with the SIO Geological Collections Manager and SIO Faculty about developing a strong transfer pathway from Palomar College to SIO/UCSD for our Earth Science students. SIO is in full support of having Palomar College students support with analyzing samples that are backlogged in SIO's extensive Geological Collections. Students would directly analyze samples using the newly acquired XRF machine from SIO. Providing unique and applicable laboratory/research opportunities would align with our desire to provide students with immersive and skill-building experiences in- and out of the classroom setting. Additionally, Earth Science faculty would gain expert knowledge to support with routine analysis of material for whomever would want to fully determine the chemical composition of any non-living material. The XRF machine can be applied to courses and research outside of the ESES Department, including Chemistry, Biology, and similar programs.

**c. What are the expected outcomes or impacts of implementation?**

Major impacts would include Palomar College Faculty and Students, as well as community partners. Palomar College Faculty (including other MSE Faculty, neighboring Community College and four-year University Faculty) could use the XRF machine for their courses (lecture and laboratory) and/or for research purposes. Palomar College Students could use the XRF machine as part of their courses (e.g., GEOL 100/100L, OCN 100/100L, GEOL 110/150), for directed study courses (e.g., OCN 295, GEOL 295), summer internships, student-led clubs, grant-funded research, or similar. Community partners would also be impacted by the implementation of the XRF as it could be used by anyone wanting to understand the chemical composition of non-living material (e.g., local industry partners).

In addition, the implementation of this XRF machine would support with Palomar College's EVP 2035 Goals of increasing enrollment rates, strengthening external partnerships/community relationships, establishing unique programs to serve our student population, reimagining instruction, and further investing in our people/processes.

**d. Timeline of implementation**

Currently, the XRF machine is sitting at SIO and needs to be moved in a timely manner. The XRF machine cannot be moved until there is 1) funding is fulfilled from the request in Part 3 of this PRP; 2) a proper space is secured to house the XRF.

Professor Shmorhun has been in regular communication with the SIO Geological Collections Manager and they are aware that implementation of the XRF at Palomar College is contingent on funding and the ability to move the machine. Ultimately, SIO would like Palomar College to have the XRF as it would support with our current transfer pathway plans between SIO and Palomar College.

**What is the anticipated cost for this request? If any, list ongoing costs for the request (additional equipment, support, maintenance, etc.).**

Widening of the door frame: \$3,000

Helium Tank wall mounts: \$200 (for purchase and for installation)

Labor: \$1,000

**Do you already have a budget for this request?**

No

**What PRP plan goal/objective does this request align with?**

Goals 1, 2 and 3

**What Educational Vision Plan 2035 Goal/Objective does this request align with?**

2:6	3:8	4:4	5:2
2:7	4:1	4:5	
3:1	4:2	4:6	
3:7	4:3	4:7	

**If you have multiple requests for facilities and had to prioritize, what number would you give this? (1 = Highest)**

1

**What impacts will this request have on the facilities/institution (e.g., water/electrical/ADA compliance, changes to a facility)?**

Moving/Removal of unused equipment currently housed in ESES Department to accommodate XRF machine, widening of a doorway to fit XRF machine, proper housing for helium tanks.

**Will you accept partial funding?**

No

**PART 5: OTHER ONE-TIME NEEDS**

For more information about funding sources available, see [IELM BLOCK GRANT, LOTTERY, PERKINS AND STRONG WORKFORCE GUIDELINES](#). Please check with your department chair on the availability for this cycle.

**Do you have one-time requests for other items (e.g., Non-technology equipment, supplies, operating expenses, travel) that your budget or other funding sources will NOT cover?**

Yes

**Requests****Item 1****What are you requesting?**

Increase in printing budget for geology and oceanography.

**Provide a detailed description of the the request. Include in your response:****a. Description of the need? (e.g., SLO/SAO Assessment, PRP data analysis)**

With the implementation of zero cost lab manuals in oceanography and geology, we are requesting an increase in the printing budget.

**b. Who will be impacted by its implementation? (e.g., individual, groups, members of department)**

Students enrolled in geology and oceanography.

**c. What are the expected outcomes or impacts or implementation?**

Increase equitable access to scientific lab manuals for community college students.

**d. Timeline of implementation**

2023-2026

**What is the anticipated cost for this request? If any, list ongoing costs for the request (additional equipment, support, maintenance, etc.).**

\$1,000

**Do you already have a budget for this request?**

Partial

**What PRP plan goal/objective does this request align with?**

Goal 1, 2, 3

**What Educational Vision Plan 2035 Goal/Objective does this request align with?**

2:6

2:7

3:1

3:7

**If you have multiple requests for facilities and had to prioritize, what number would you give this? (1 = Highest)**

4

**What impacts will this request have on the facilities/institution (e.g., water/electrical/ADA compliance, changes to a facility)?**

No change to facility

**Will you accept partial funding?**

Yes

**Budget Category**

Supplies

Please upload a copy of the quote, if available.

**I confirm that all full-time faculty in this discipline have reviewed the PRP. The form is complete and ready to be submitted.**

Yes

**Enter your email address to receive a copy of the PRP to keep for your records.**

nshmorhun@palomar.edu

## Feedback and Review

### Department Chair

I confirm that the PRP is complete.

No

Department Chair Name

Date