Yearly report for the Elizabeth and Richard Henes Center for Quantum Phenomena (CQP) for fiscal year 2022

Summary:

(1) Total number of awards:	7	vs	9	in 2021
(2) Total number of projects:	13	vs	13	in 2021
(3) Total awards in dollars:	$603,500	vs	$605,500	in 2021
(4) Total expenditures:	$569,000	vs	$563,500	in 2021
(5) IRAD return:	$27,000	vs	$30,500	in 2021

Externally funded active esearch projects during fiscal your 2022.

(1) Miguel Levy:	
(a) SRICO-CQP-Optical Isolator Phase 2 -1	E47434
(b) SRICO-CQP-Optical Isolator Phase 2-2	E47576
(2) Ramy El-Ganainy:	
(a) NSF-CQP-Collaborative Rsh:Wave Mixing	E42586
(b) UNIVE-CQP- ADV ACCT-Quantum Dynamics	E48306
(c) UNIVE-CQP-ADV ACCT-Quantum Dynamics year II	E48371
(3) Ravi Pandey:	
(a) USARM-CQP-First Principles Studies	E40370
(b) LAWRE-CQP-Computational Assessment	E46702
(4) Dongyan Zhang:	
(a) STABI-CQP-High Brightness Fluoropho -1	E47438
(b) STABI-CQP-High Brightness Fluoropho -2	E47439
(c) STABI-CQP-PCR Probes	E47575
(5) Issei Nakamura:	
(a) NSF-CQP-CAREER: Ion Salvation	E42967
(6) Alex Kostinski:	
(a) NSF-CQP-Correlated Random Process	E43518
(b) LAWRE-CQP-Support for Gas-Gun Expertise	E46716

CQP's sponsored activities in fiscal year 2022 (IRAD account E35234):

(1) Summer visiting scholar – Sumandeep Kaur	$6,800
(2) Travel to conferences and scientific centers	
(a) Faculty	$12,500
(b) Students	$5.900
(3) Cost share: (MTU Covid-19 grants)	$2,500
(a) Graduate student support (stipend, tuition fringes)	$6,600
(4) Contribution to the maintains cost of MTU shared instruments:	
(a) TITAN, FIB, SEM	$4,000
(5) Repair and maintenance of scientific equipment owned by members	$4,100
(6) Software licenses	$1,500

Total expenditures for the year from CQP IRAD account	~(**$43,900)**
Total return into CQP IRAD account	**~$27,000**
Balance at the beginning of fiscal year 2022	**~$61,700**
Balance at the beginning of fiscal year 2023	**~$44,800**

Commitments for fiscal year 2023 from IRAD return:

(1) Graduate students (stipends, tuition, fringes, fellowships)	$26,000
(2) Visiting scientists	$10,000
(3) Travel to conferences and research centers (graduate students)	$15,000
(4) Shared equipment – Titan, FIB, STEM	$4,000
(5) Mandatory matching (MRI)	$20,000
Total commitments	**$75,000**

Expenditures during fiscal year 2022 from sources other than CQP IRAD return:

(1) Graduate students (stipends, tuition, fringes, fellowships)	$80,600
(2) Undergraduate student research fellowships:	$20,300
(3) Undergraduate student study abroad support	$27,200
(4) Undergraduate students research awards	$2,500
(5) Director one month summer compensation + fringes	$15,100

Total expenditures from sources other than CQP IRAD return	~**$147,500**

Graduate students research fellows:

Aryal, Sandip
Lata, Nurun Nahar
Boora, Manpreet
Gao, Tong
Sachdeva, Geeta
Shock, Cameron John.

Undergraduate students research fellows and their projects:

Andersen, L.Reed. "Light Curves, From Relativistic Image Doubling"
Sloma, Benjamin J. `` Photoacoustic Spectroscopy, application to Aerosols''
Turkovich, James E. `` Cutting Efficiency and Length Uniformity of Thin Diameter BNNTs''
Gaertner, Zoe D. ``Quantum Correlation of photons''
Fritts, Marc Charles. `` Simulation Results of Scalar Advection in Turbulence''
Kieft, Trevor Andrew. ``Filter based Raman Spectrometer''
Knight, D. Christopher. `` Assessing the Self-Assessment of Students in Physics''
Mashburn, Carter R. ``Pure Rotational Raman Sensor''
Bethany Hellman ``Laser Diode Tapered Amplifier for Raman Spectroscopy''

Undergradate students awards recipients:

The Elizabeth Henes award for an outstanding woman physics graduate:
Casey Aldrich and Bethany Hellman

Ian Sheppard research award for an outstanding physics graduate:
Trevor Kieft

Study abroad:
Undergraduate students learning goal 3: Global literacy

At the end of Spring Semester of 2022, senior class of physics majors (Bethany Hellman, Casey Aldrich, Dalton Knight, Daniel Koshar, Karavela Zeiter, Marc Fritts. Riley Dickert, Sarah Huffman, Trevor Kieft and Wyatt Reller) spent a week in Paris, France. For centuries Paris has been one of the world's most influential centers for sciences, arts, architecture, finance and fashion.

Students toured academic Centers:

(1) The University of Paris (Sorbonne) which has been active since 1150
(2) The Laboratories for Optics and Biosciences at Ecole Polytechnique

Students visited history and arts museum:

(1) The world's most visited museum, the Louvre Museum which houses Venus de Milo and Mona Lisa among many best known art work in the world.
(2) Musee d'Orsay home to greatest masterpieces in the world, by painters including Berthe Morisot, Monet, Manet, Degas, Renoir, Cézanne, Seurat, Sisley, Gauguin, and Van Gogh. Musee d'Orsay is the largest arts museum in Europe.
(3) The Panthéon the church of Saint Genevieve transformed into a mausoleum where bodies of famous writers like Victor Hugo, Émile Zola, president of France Charles de Gaulle and Marie Curie the first woman who won the Nobel prize and one of only four Nobel laurates to receive it twice rest in peace.

Students learned about architectural master pieces:

(1) the Cathedral of Notre Dame de Paris, Gothic royal chapel of Sainte-Chapelle, the Eiffel Tower, the Grand Palais and Petit Palais, the Arc de Triomphe, Montmartre and Basilica of Sacré-Coeur
(2) Palace of Versailles outside Paris designated a World Heritage Site by UNESCO in 1979.

Students payed tribute to famous people buried at cemeteries in Paris:

(1) Père Lachaise Cemetery. Artists buried there include Frédéric Chopin, Gioachomo Rossini, Édith Piaf, Marcel Proust, Sarah Bernhardt and Jim Morrison.
(2) Holy Innocents' Cemetery, Montparnasse Cemetery and Montmartre Cemetery

Students studied Paris as a political capital of the world:

(1) The United Nations Educational, Scientific and Cultural Organization (UNESCO)
(2) The World Federation of Engineering Organizations
(3) The International Energy Agency
(4) The International Federation for Human Rights
(5) the European Space Agency

Assessment team: Prof. Ravindra Pandey and Prof. Jacek Borysow