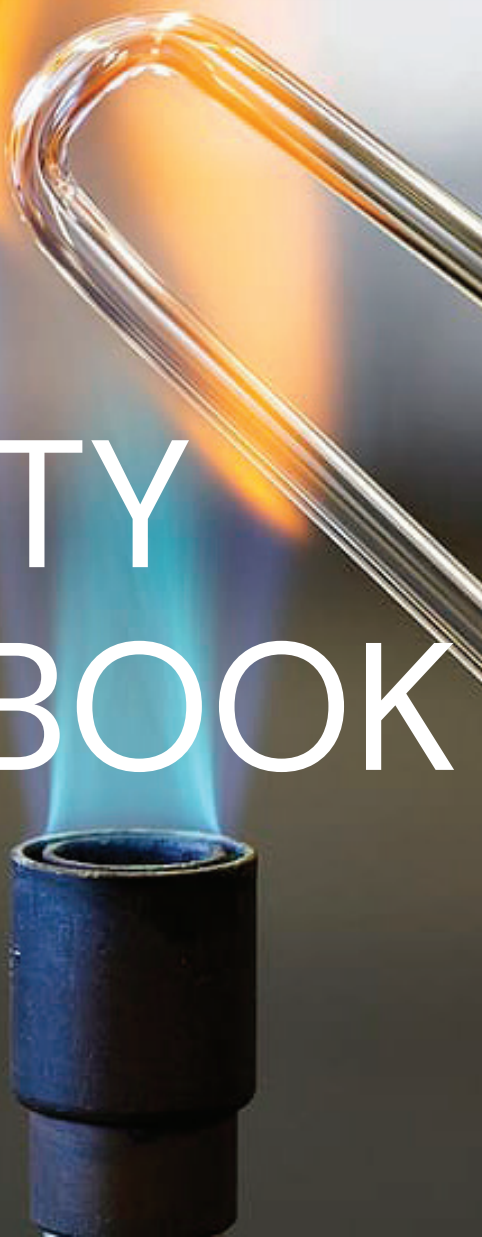




Vermont  
Biomedical  
Research  
Network

# VBRN FACULTY HANDBOOK 2021



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## ABOUT THIS HANDBOOK

This handbook has been created to help clarify the Vermont Biomedical Research Network's (VBRN) goals and policies as we enter Year 2 of our INBRE 4 phase. I would like to emphasize that VBRN is here to support faculty and undergraduate research across Vermont. Please feel free to reach out to myself or other VBRN staff if any questions should arise. We are here to help!



Dr. Tabitha Finch

## MESSAGE FROM THE DIRECTOR

The VBRN has a goal of increasing the infrastructure for biomedical research in the state of Vermont through funding faculty research at the baccalaureate institutions and involving undergraduates in this research. This handbook provides guidance to both faculty who intend to apply for VBRN funding and those currently funded by VBRN, as well as their science mentors. I hope that it will answer most of your questions.

As we continue our fourth phase, I believe the Vermont Biomedical Research Network is positioned to continue to enhance biomedical research throughout Vermont!



Dr. Rex Forehand

# VBRN STAFF

Rex Forehand, Director

[Rex.Forehand@uvm.edu](mailto:Rex.Forehand@uvm.edu)

Heather Driscoll, Program Coordinator

[hdriscol@norwich.edu](mailto:hdriscol@norwich.edu)

## **Proteomics Core**

Wai Lam, Director

[Wai.Lam@uvm.edu](mailto:Wai.Lam@uvm.edu)

Bin Deng, Manager

Clarissa Gold, Technician

## **Bioinformatics Core**

Heather Driscoll, Analyst

[hdriscol@norwich.edu](mailto:hdriscol@norwich.edu)

## **Professional Development & Education (PDE) Core**

Tabitha Finch, Director

[Tabitha.Finch@uvm.edu](mailto:Tabitha.Finch@uvm.edu)

## **Administrative Core**

[vbrn@uvm.edu](mailto:vbrn@uvm.edu)

Briana Sadler, Administrative Coordinator

Nate Herzog, IT Specialist

Alicia McNally, Business Manager

Marianne Baggs, Program Assistant

# VBRN MISSION STATEMENT

## **VBRN Mission Statement**

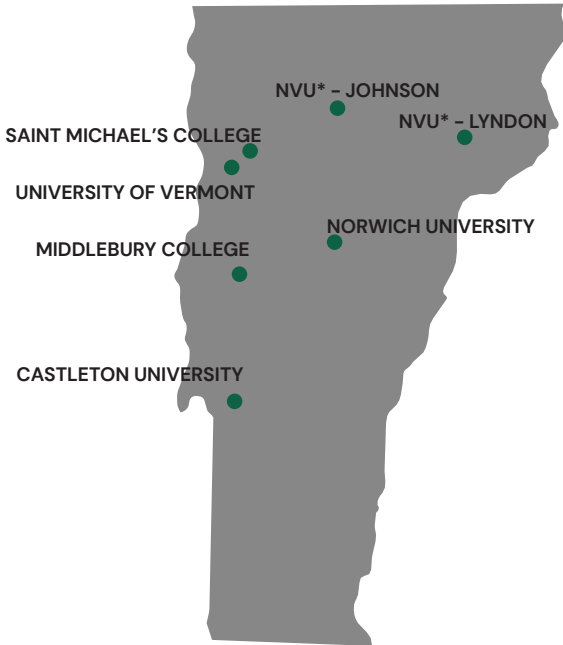
The mission of VBRN is to build a culture to promote the biomedical research infrastructure in Vermont. Our focus is on human health and behavior as broadly defined. The goal is to build and sustain a culture of research throughout the state by facilitating the research capacity of faculty members, and the education of undergraduates, at our baccalaureate partner institutions.

## **IDeA Networks of Biomedical Research Excellence (INBRE) Program Goals as defined by the National Institute of General Medical Sciences (NIGMS)**

The primary goals of the INBRE program are to: 1) build on the established multi-disciplinary research network with a scientific focus to strengthen the biomedical research expertise and infrastructure of the lead and partner institutions; 2) build and increase the research base and capacity by providing support to faculty, postdoctoral fellow and graduate students at the participating institutions; 3) provide research opportunities for students from primarily undergraduate institutions, community colleges and Tribally Controlled Colleges and Universities (TCCUs) as appropriate and serve as a “pipeline” for these students to continue in health research careers within Institutional Development Award (IDeA) states; and 4) enhance science and technology knowledge of the state’s workforce.

# ABOUT VBRN

The Vermont Biomedical Research Network (VBRN) is in its fourth phase of funding with a five-year \$19.4 million award from the INBRE program of the NIGMS at the National Institutes of Health. The mission of VBRN is to build human and physical infrastructure in Vermont for biomedical research. At the lead institution, the University of Vermont, we have developed state-of-the-art facilities for Proteomics and Bioinformatics to provide to researchers across Vermont the resources they need to carry out world class research and compete for federal funding. To address workforce development and its diversity, we build cultures of research by supporting faculty and student research at our Baccalaureate Partner Institutions: Castleton University, Middlebury College, Northern Vermont University (Lyndon and Johnson campuses), Norwich University, and Saint Michael's College. We also work with students in college lab classes throughout Vermont in order to bring state-of-the-art research resources into their education, including at the Community College of Vermont, Landmark College, and Champlain College.



\*NORTHERN VERMONT UNIVERSITY



VBRN is funded by the National Institute of General Medical Sciences as part of the **National Institutes of Health initiative IDeA Networks of Biomedical Research Excellence (INBRE)** under award number P20-GM103449.

# VBRN BACCALAUREATE PARTNER INSTITUTIONS

Each Baccalaureate Partner Institute (BPI) has a Coordinator on campus to work with VBRN faculty and students over the course of the entire calendar year. BPI Coordinators should be the first point of contact for faculty and students who have VBRN-related questions. The Coordinators understand VBRN policies and the award process, and can provide a wealth of knowledge and support. Specifically, BPI Coordinators are expected to actively meet with VBRN funded faculty, read drafts of grant proposals, assist in the VBRN Award and reporting processes, help organize VBRN's annual faculty professional development events, monitor the mentoring of faculty and students, and work with campus administrators to expand and sustain a culture of research.

Institution	Coordinator
Castleton University	Dr. Andrew Vermilyea
Middlebury College	Dr. Robert Cluss
Northern Vermont University (Lyndon and Johnson campuses)	Dr. Gregory Petrics
Norwich University	Dr. Darlene Olsen
Saint Michael's College	Dr. Mark Lubkowitz

## 2021 VBRN FUNDED FACULTY

Name	Institution	Award Category	Title
Eleanor Beltz	Northern Vermont University – Johnson	Pilot Award	Serial Movement Assessment in Athletes Who Perform Injury Prevention Training
Natalie Cartwright	Norwich University	Pilot Award	Youth Firearm Violence: A Machine Learning Approach
Clinton Cave	Middlebury College	Pilot Award	The Role of GDE6 in Radical Glia Proliferation
Andrea Corcoran	Castleton University	Pilot Award	Cannabidiol and Autonomic Function in Individuals at Rest
Connie Hassett-Walker	Norwich University	Pilot Award	Impact of Criminal Conviction & Incarceration on Long-Term Health & Substance Use
Michael Linderman	Middlebury College	Project Award	Non-parametric Genotyping of Structural Variants in Whole Genome Sequencing Data
Lindsay Repka	Middlebury College	Project Award	Alkoxyamide Photoredox Crosslinking: A New Approach to Target Identification and Interactome Mapping
Helene Sisti	Norwich University	Pilot Award	The Neural Dynamics of Real and Imagined Movement using a Bimanual Learning Task
Emily Tarleton	Northern Vermont University – Johnson	Pilot Award	Steady ON FOCUS: Identifying the Needs of Community- Dwelling Older Vermonters to Decrease Fall and Malnutrition Risk

# VBRN AWARDS

VBRN has three funding mechanisms, described below, to support faculty research: Project Awards, Pilot Awards and Exploratory Awards. Faculty who receive VBRN funding are required to have a science mentor (see [page 19](#) for details).

**Eligibility:** Faculty members who are full-time tenure track at one of our Baccalaureate Partner Institutions are eligible to apply for VBRN funding. Priority will be given to early career faculty.

**Funding Limits:** There is a limit to the number of years of VBRN funding an investigator may receive. Eligible faculty may receive up to four years of funding (exclusive of the INBRE 3 Small Award category). VBRN recognizes that the BPIs are at different stages in developing and sustaining their cultures of research and will accept requests for a fifth year of funding for compliant faculty. These requests will be reviewed on an individual basis, and will involve input from the science mentor and the BPI coordinator, and supporting documentation that includes reviews from extramural grant proposals. Progress toward extramural funding must be demonstrated in order to be eligible for a fifth year of VBRN funding.

**Review of VBRN Award Applications:** The review of Project, Pilot, and Exploratory Award applications begins with the assignment of the application to at least two and preferably three outside reviewers. The reviewers are given the Request For Applications (RFA) and are asked to write a short response for each of the NIH review criteria (Significance, Investigator, Innovation, Approach and Environment). The NIH utilizes a 9-point rating scale (1 = exceptional; 9 = poor) for all applications; the same scale is used for overall impact scores and for criterion scores. As with NIH reviews, when the reviewer has submitted their online reviews, they can then see the critiques of others who have the same application assignments. Reviewers are compensated for this work. This is a confidential process and the reviewers are asked not to share any insights into their reviews or even which applications they reviewed, just as at NIH. VBRN does not share the list of reviewers because the pool of reviewers is not as large as at NIH.

Once the reviews and scores are compiled, the VBRN Director, Program Coordinator, and PDE Core Coordinator read the reviews and analyze the results. The pay line is determined by the amount of funding that is available for Project, Pilot, and Exploratory Awards that year. Other data (publication record, compliance with VBRN requirements for funding, advisor reports, and the critiques of proposals submitted to federal agencies) are also considered when making the final decisions about funding.

VBRN's goal is to fund as many Awards as possible, but fund only meritorious applications.

**Policy on Sharing Grant Reviews:** While VBRN has requested grant reviews from our funded faculty in the past, beginning with the INBRE 4 phase, we are formalizing this process. VBRN funded faculty are expected to share any extramural grant reviews with their science mentor, BPI Coordinator and VBRN's Professional Development and Education Core. These reviews will be kept confidential. This will facilitate the faculty mentoring process and allow VBRN funded faculty to receive useful feedback on their resubmission plans.



## Request For Applications (RFA)

### Project Award

**Project Duration:** Two years

**Eligibility:** Faculty members who are full-time tenure track at Castleton University, Middlebury College, Northern Vermont University, Norwich University, or Saint Michael's College. Research must be in human health and behavior (broadly defined). Clinical trials are allowed. To determine whether the proposed study is a clinical trial, use the [NIH decision tool](#).

**Funding Level and Allowable Expenses:** Direct costs up to \$75,000 per year may be requested. NIH requires that a Project Award PI spend on average 50% effort in research over the award year, which can be divided into summer and academic year time. Permitted expenses include PI salary for summer and/or academic year, technicians, supplies, small equipment, undergraduate wages, participant costs and conference travel. Use of the funds must be outlined and justified as part of the application.

**Review of Applications:** The review of Project Award applications begins with the assignment of the application to at least two and preferably three outside reviewers. The reviewers are given the Request For Applications (RFA) and are asked to score the application based on the NIH review criteria used for the R15 AREA grant, which includes Significance, Investigator, Innovation, Approach and Environment. The NIH utilizes a 9-point rating scale (1 = exceptional; 9 = poor) for all applications; the same scale is used for criterion scores and for the overall impact score.

#### Project Award Key Dates

##### Grant Writing Workshop Attendance

**DATE: October 24, 2020**

In order to be eligible for 2021–2022 Project Award funding, faculty must attend the online VBRN Grant Writing Workshop.

##### Letter of Intent

**DUE: December 1, 2020**

Applicants must submit a Letter of Intent to VBRN with a working title and key words. VBRN will distribute the template to those who attended the Grant Writing Workshop.

##### Application Due Date

**DUE: February 1, 2021**

Project Award applications are submitted online via the VBRN application site, which will be accessible beginning in early December 2020. Funding decisions are made and communicated to applicants by the end of March. Note that formatting must adhere to NIH standards as outlined on their [website](#).

For the following application components, use the hyperlinked documents as provided. Please submit all documents in the PDF format, except for the Budget and Budget Justification, which should be submitted as Word documents.

All applicants must contact a federal Program Officer at an NIH Center or Institute to verify that the proposed research is fundable by the NIH. If this is a renewal application, the applicant's science mentor must review the proposal before submission.

Application components include:

- Face Page

**(Face Page must be emailed to [vbrn@uvm.edu](mailto:vbrn@uvm.edu) by February 4, 2021)**

- Must be signed by BPI Coordinator and institutional grants officials (boxes 12 and 13)
- List direct costs only (boxes 7a and 8b)
- List total costs (including Facilities and Administrative costs, boxes 7b and 8b)
- Include eRA Commons User Name (box 3h)
- Include NIH Center or Institute for the Research and the Name of a Program Officer

- [Project Summary and Relevance](#) (submit as PDF)

- [Budget](#) (submit one document for each year of the award, and both as Word documents)

(Not to exceed one page)

- List direct costs only
- Fill in total amount for Facilities and Administrative costs
- Must be reviewed by the institutional BPI Coordinator

- [Budget Justification](#) (submit one document for each year of the award, and both as Word documents)

(Not to exceed three pages)

- Must be reviewed by the institutional BPI Coordinator

- [Research Plan](#) (submit as PDF)

(Not to exceed 11 pages, or 13 pages if applying for a renewal)

- Specific Aims (not to exceed one page)
- Progress Report (not to exceed two pages; only for renewal applications)
- Research Strategy (not to exceed 10 pages)
- Literature Cited (as many pages as needed)

- [Research Resources and Environment](#) (submit as PDF)

- [Biosketch](#) (submit as PDF)

- For human subjects research, IRB approvals\*

- PHS Human Subjects and Clinical Trials Information Form
- Institutional IRB approval letter (with specified dates for which the research is approved)
- The approved IRB research protocol
- Current Human Subjects Education Certification for all key personnel

- For clinical trial studies, IRB approval\*

- PHS Human Subjects and Clinical Trials Information Form
- Include the ClinicalTrials.gov Identifier (NCT number, section 1.5)
- Institutional IRB approval letter (with specified dates for which the research is approved)
- The approved IRB research protocol
- Current Human Subjects education certification for all key personnel

- Current Good Clinical Practice certification for all key personnel
- If applicable, IACUC approvals\*
  - Institutional IACUC approval letter (with specified dates for which the research is approved)
  - A copy of the approved research protocol
  - [Vertebrate Animals Section](#)
- Supporting documents (as applicable; e.g. Letters of Support, Equipment Quotes, etc.)
 

\*IRB and IACUC approvals must be submitted with the application by the due date. **A proposal will not be reviewed with a pending status.** If the institutional approval expires over the duration of the two year award, the PI is responsible for sending an updated approval letter.

#### Funding Period:

**June 1, 2021 – May 31, 2023**

Funding of awards is contingent upon NIH approval. Award funds must be spent in the award period; carryover of funds is not allowed.

#### Project Award Conditions

#### Year One (June 1, 2021–May 31, 2022)\*\*

Completion of the following:

- Individual Development Plan (IDP) due September 1, 2021.
- Two telephone discussions of the IDP with the VBRN Director, the PDE Core Director, and the BPI Coordinator.
- Annual VBRN survey and periodic VBRN longitudinal surveys.
- Research Performance Progress Report (RPPR).
- Submit a manuscript based on VBRN-funded research to a peer-reviewed journal by June 1, 2022.

Attendance at the following:

- Annual VBRN Faculty Retreat in Summer 2021.
- VBRN Professional Development Seminar in Winter 2022.
- Annual VBRN Career Day for students in April 2022.
- Note that while attendance at the Grant Writing Workshop is not required, attendance is strongly encouraged.

**\*\*Funding for the second year is contingent upon meeting the requirements in Year One.**

#### Year Two (June 1, 2022–May 31, 2023)

Completion of the following:

- Individual Development Plan (IDP) due September 1, 2022.
- Two telephone discussions of the IDP with the VBRN Director, the PDE Core Director, and the BPI Coordinator.
- Annual VBRN survey and periodic VBRN longitudinal surveys.
- Research Performance Progress Report (RPPR).

- Have a manuscript published OR have revised and resubmitted a manuscript based on VBRN-funded research to a peer-reviewed journal by June 1, 2023.
- Submit a second manuscript based on VBRN-funded research to a peer-reviewed journal OR submit an extramural grant proposal by June 1, 2023.\*\*\*

Attendance at the following:

- Annual VBRN Faculty Retreat in Summer 2022 and 2023.
- VBRN Professional Development Seminar in Winter 2023.
- Annual VBRN Career Day for students in April 2023.

**\*\*\*The decision to submit either a second manuscript or a grant proposal will be made by the PI, the BPI Research Coordinator and VBRN's Professional Development and Education Core Director.**

Any work resulting from this Award must acknowledge VBRN as a source of funding, details of which can be found on the VBRN website and in the faculty handbook. All publications from VBRN funded research are required to meet the NIH public access policy. (Details on this requirement can be found on [page 38](#).)

## Request For Applications (RFA)

### Pilot Award

**Project Duration:** One year

**Eligibility:** Faculty members who are full-time tenure track at Castleton University, Middlebury College, Northern Vermont University, Norwich University, or Saint Michael's College. Research must be in human health and behavior (broadly defined). Clinical trials are allowed. To determine whether the proposed study is a clinical trial, use the [NIH decision tool](#).

**Funding Level and Allowable Expenses:** Direct costs up to \$25,000 per year may be requested. Permitted expenses include PI salary for summer and/or academic year, technicians, supplies, small equipment, undergraduate wages, participant costs and conference travel. Use of the funds must be outlined and justified as part of the application.

**Review of Applications:** The review of Pilot Award applications begins with the assignment of the application to at least two and preferably three outside reviewers. The reviewers are given the Request For Applications (RFA) and are asked to score the application based on the NIH review criteria used for the R15 AREA grant, which includes Significance, Investigator, Innovation, Approach and Environment. The NIH utilizes a 9-point rating scale (1 = exceptional; 9 = poor) for all applications; the same scale is used for criterion scores and for the overall impact score.

#### Pilot Award Key Dates

##### Grant Writing Workshop Attendance

**DATE: October 24, 2020**

In order to be eligible for 2020–2021 Pilot Award funding, faculty must attend the online VBRN Grant Writing Workshop.

##### Letter of Intent

**DUE: December 1, 2020**

Applicants must submit a Letter of Intent to VBRN with a working title and key words. VBRN will distribute the template to those who attended the Grant Writing Workshop.

##### Application Due Date

**DUE: February 1, 2021**

Pilot Award applications are submitted online via the VBRN application site, which will be accessible beginning in early December 2020. Funding decisions are made and communicated to applicants by the end of March. Note that formatting must adhere to NIH standards as outlined on their [website](#).

For the following application components, use the hyperlinked documents as provided. Please submit all documents in the PDF format, except for the Budget and Budget Justification, which should be submitted as Word documents.

All applicants must contact a federal Program Officer at an NIH Center or Institute to verify that the proposed research is fundable by the NIH. If this is a renewal application, the applicant's current science mentor must review the proposal before submission.

Application components include:

- Face Page

**(Face Page must be emailed to [vbrn@uvm.edu](mailto:vbrn@uvm.edu) by February 4, 2021)**

- Must be signed by BPI Coordinator and institutional grants officials (boxes 12 and 13)
- List direct costs only (boxes 7a and 8b)
- List total costs (including Facilities and Administrative costs, boxes 7b and 8b)
- Include eRA Commons User Name (box 3h)
- Include NIH Center or Institute for the Research and the Name of a Program Officer

- [Project Summary and Relevance](#) (submit as PDF)

- [Budget](#) (submit one document for each year of the award, and both as Word documents)

(Not to exceed one page)

- List direct costs only
- Fill in total amount for Facilities and Administrative costs
- Must be reviewed by the institutional BPI Coordinator

- [Budget Justification](#) (submit one document for each year of the award, and both as Word documents)

(Not to exceed three pages)

- Must be reviewed by the institutional BPI Coordinator

- [Research Plan](#) (submit as PDF)

(Not to exceed six pages, or eight pages if applying for a renewal)

- Specific Aims (not to exceed one page)
- Progress Report (not to exceed two pages; only for renewal applications)
- Research Strategy (not to exceed five pages)
- Literature Cited (as many pages as needed)

- [Research Resources and Environment](#) (submit as PDF)

- [Biosketch](#) (submit as PDF)

- For human subjects research, IRB approvals\*

- PHS Human Subjects and Clinical Trials Information Form
- Institutional IRB approval letter (with specified dates for which the research is approved)
- The approved IRB research protocol
- Current Human Subjects Education Certification for all key personnel

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- The approved IRB research protocol
- Current Human Subjects education certification for all key personnel

- Current Good Clinical Practice certification for all key personnel
- If applicable, IACUC approvals\*
  - Institutional IACUC approval letter (with specified dates for which the research is approved)
  - A copy of the approved research protocol
  - [Vertebrate Animals Section](#)
- Supporting documents (as applicable; e.g. Letters of Support, Equipment Quotes, etc.)
 

\*IRB and IACUC approvals must be submitted with the application by the due date. **A proposal will not be reviewed with a pending status.** If the institutional approval expires over the duration of the two year award, the PI is responsible for sending an updated approval letter.

### Funding Period:

**June 1, 2021–May 31, 2022**

Funding of awards is contingent upon NIH approval. Award funds must be spent in the award period; carryover of funds is not allowed.

### Pilot Award Conditions

Completion of the following:

- Individual Development Plan (IDP) due September 1, 2021.
- Two telephone discussions of the IDP with the VBRN Director, the PDE Core Director, and the BPI Coordinator
- Annual VBRN survey and periodic VBRN longitudinal surveys.
- Annual Progress Report (APR).
- For PIs with no previous VBRN Project or Pilot Award funding: Submit a draft manuscript (minimally Methods and Results sections) with revisions recommended by your science mentor based on VBRN-funded research by June 1, 2022.
- For PIs with one year of previous VBRN Pilot Award funding: Submit a manuscript based on VBRN-funded research to a peer-reviewed journal by June 1, 2022.
- For PIs with two or more years of previous VBRN Pilot Award funding: VBRN Director, the PDE Core Director, and the BPI Coordinator determine Award conditions.

Attendance at the following:

- Annual VBRN Faculty Retreat in Summer 2021 and 2022.
- VBRN Professional Development Seminar in Winter 2022.
- Annual VBRN Career Day for students in April 2022.

Any work resulting from this Award must acknowledge VBRN as a source of funding, details of which can be found on the VBRN website and in the faculty handbook. All publications from VBRN funded research are required to meet the NIH public access policy. (Details on this requirement can be found on [page 38](#).)

## Request For Applications (RFA)

### Exploratory Award

**Purpose:** To establish feasibility of a research project and obtain preliminary data.

**Project Duration:** One year

**Eligibility:** Faculty members who are full-time tenure track at Castleton University, Middlebury College, Northern Vermont University, Norwich University, or Saint Michael's College. Research must be in human health and behavior (broadly defined). Clinical trials are allowed. To determine whether the proposed study is a clinical trial, use the [NIH decision tool](#).

**Funding Level and Allowable Expenses:** Direct costs up to \$10,000 per year may be requested. Permitted expenses include PI salary for summer and/or academic year, technicians, supplies, small equipment, undergraduate wages, participant costs and conference travel. Use of the funds must be outlined and justified as part of the application.

**Review of Applications:** The review of Exploratory Award applications begins with the assignment of the application to at least two and preferably three outside reviewers. The reviewers are given the Request For Applications (RFA) and are asked to score the application based on the NIH review criteria used for the [R15 AREA](#) grant, which includes Significance, Investigator, Innovation, Approach and Environment. The NIH utilizes a 9-point rating scale (1 = exceptional; 9 = poor) for all applications; the same scale is used for criterion scores and for the overall impact score.

#### Exploratory Award Key Dates

##### Grant Writing Workshop Attendance

**DATE: October 24, 2020**

In order to be eligible for 2020–2021 Exploratory Award funding, faculty must attend the VBRN Grant Writing Workshop at the University of Vermont.

##### Letter of Intent

**DUE: December 1, 2020**

Applicants must submit a Letter of Intent to VBRN with a working title and key words. VBRN will distribute the template to those who attended the Grant Writing Workshop.

##### Application Due Date

**DUE: February 1, 2021**

Exploratory Award applications are submitted online via the VBRN application site, which will be accessible beginning in early December 2020. Funding decisions are made and communicated to applicants by the end of March. Note that formatting must adhere to NIH standards as outlined on their [website](#).

For the following application components, use the hyperlinked documents as provided. Please submit all documents in the PDF format, except for the Budget and Budget Justification, which should be submitted as Word documents.

All applicants must contact a federal Program Officer at an NIH Center or Institute to verify that the proposed research is fundable by the NIH. If this is a renewal application, the applicant's current science mentor must review the proposal before submission.



Application components include:

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- Include NIH Center or Institute for the Research and the Name of a Program Officer

- [Project Summary and Relevance](#) (submit as PDF)

- [Budget](#) (submit one document for each year of the award, and both as Word documents)

(Not to exceed one page)

- List direct costs only
- Fill in total amount for Facilities and Administrative costs
- Must be reviewed by the institutional BPI Coordinator

- [Budget Justification](#) (submit one document for each year of the award, and both as Word documents)

(Not to exceed three pages)

- Must be reviewed by the institutional BPI Coordinator

- [Research Plan](#) (submit as PDF)

(Not to exceed four pages, or six pages if applying for a renewal)

- Specific Aims (not to exceed one page)
- Progress Report (not to exceed two pages; only for renewal applications)
- Research Strategy (not to exceed three pages)
- Literature Cited (as many pages as needed)

- [Research Resources and Environment](#) (submit as PDF)

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- For human subjects research, IRB approvals\*

- PHS Human Subjects and Clinical Trials Information Form
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- PHS Human Subjects and Clinical Trials Information Form
- Include the ClinicalTrials.gov Identifier (NCT number, section 1.5)
- Institutional IRB approval letter (with specified dates for which the research is approved)
- The approved IRB research protocol
- Current Human Subjects education certification for all key personnel

- Current Good Clinical Practice certification for all key personnel
- If applicable, IACUC approvals\*
  - Institutional IACUC approval letter (with specified dates for which the research is approved)
  - A copy of the approved research protocol
  - [Vertebrate Animals Section](#)
- Supporting documents (as applicable; e.g. Letters of Support, Equipment Quotes, etc.)
 

\*IRB and IACUC approvals must be submitted with the application by the due date. **A proposal will not be reviewed with a pending status.** If the institutional approval expires over the duration of the two year award, the PI is responsible for sending an updated approval letter.

### Funding Period: June 1, 2021–May 31, 2022

Funding of awards is contingent upon NIH approval. Award funds must be spent in the award period; carryover of funds is not allowed.

### Exploratory Award Conditions

Completion of the following:

- Individual Development Plan (IDP) due September 1, 2021.
- Two telephone discussions of the IDP with the VBRN Director, the PDE Core Director, and the BPI Coordinator.
- Annual VBRN survey and periodic VBRN longitudinal surveys.
- Research Performance Progress Report (RPPR).
- Submit a draft manuscript (minimally Methods and Results sections) with revisions recommended by your research advisor based on VBRN-funded research by June 1, 2022.

Attendance at the following:

- Annual VBRN Faculty Retreat in Summer 2021 and 2022.
- VBRN Professional Development Seminar in Winter 2022.
- Annual VBRN Career Day for students in April 2022.

Any work resulting from this Award must acknowledge VBRN as a source of funding, details of which can be found on the VBRN website and in the faculty handbook. All publications from VBRN funded research are required to meet the NIH public access policy. (Details on this requirement can be found on [page 38.](#))

# VBRN SCIENCE MENTOR AND MENTEE EXPECTATIONS

Science mentors work with our faculty to ensure that their research plans and career development move forward. VBRN Awardees are required to have a science mentor that can be based anywhere in the United States.

## **VBRN science mentors agree to:**

Attend a virtual mentor orientation (date in early June TBD) for which you will be compensated \$300

Send reports describing your interaction with your mentee to VBRN two times per year on February 1 and May 1

Communicate with your mentee throughout the year at the following intervals:

- Beginning of the award year
- End of the summer research period
- Beginning of the spring semester
- End of the award year

Provide feedback on draft manuscripts and grant proposals

Help your mentee complete the VBRN Individual Development Plan that outlines goals for their research progress by September 1

## **VBRN funded faculty mentees agree to:**

Be proactive in initiating contact with your science mentor

Communicate with your science mentor throughout the year at the following intervals:

- Beginning of the award year
- End of the summer research period
- Beginning of the spring semester
- End of the award year

Send manuscripts and grant proposal drafts to your science mentor for review before submission

Work with your science mentor to complete the VBRN Individual Development Plan that outlines goals for your research progress by September 1

# INDIVIDUAL DEVELOPMENT PLAN

The Individual Development Plan (IDP) is a common tool used for reflecting on and planning for professional career goals. It provides a personal roadmap for accomplishing immediate, intermediate and long-term goals by identifying skills and developmental needs, resource needs, mentors and role models, and target dates for career building milestones. Treat this as a live document, subject to periodic review and revisions, as needed to correct course, and as a compact with your VBRN assigned mentor. This IDP is limited to your VBRN related research commitment.

Here are some quick tips for a successful IDP:

- Communicate with your VBRN science mentor early and often; take the lead in maintaining contact and take ownership of your professional development.
- Set aside time: discuss strategies to achieve goals as well as obstacles that may be hindering your progress. Set clear expectations.
- Supplement this IDP with additional resources from within your own institution and professional organizations, as appropriate.
- Follow the process outlined below to prepare a first draft of an IDP prior to meeting with your mentor. Discuss with your mentor, reflect on the feedback received before making revisions, and revisit with your mentor before implementing your strategy.
- Do not hesitate to reach out to the BPI Coordinator at your institution and/or Tabitha Finch (Professional Development & Education Core) in the UVM VBRN office. They are here to facilitate your work, including if you find yourself in a difficult or uncomfortable situation in your mentoring relationship.

## Process

### Step 1.

Think intentionally about your goals and prepare a timeline: for each, identify the BIG GOAL and the interim steps towards the goal. Include actions that you need to take as well as activities that you need to stop doing to achieve the goal. Be as specific as possible. Justify how each interim step contributes towards the BIG GOAL and indicate how you will measure progress and completion to a successful outcome. List your goals in order of priority: Incorporating key VBRN deadlines into your timeline. The timeline below is divided into three periods and is based on a one-year project/pilot funding period. (Note that funding is for one year with a renewal application with demonstrated progress meriting additional funding.)

1. Immediate – within the next three months
2. Intermediate – within the next three to six months
3. Long-term – within the next six to twelve months

## Step 2.

Assign each goal to a category below and indicate percent effort you will dedicate.

### 1. Research

- a) Acquire requisite skills (e.g., technical, lab management)
- b) Mentor and train students
- c) Design methods, conduct experiments, analyze data

### 2. Grants and Funding

- a) Acquire requisite skills (e.g., hypothesis framing, grant writing mechanics)
- b) Identify funding source and establish connection with agency/program officer
- c) Work backwards from the due date to establish milestones and their target dates

### 3. Collaborations or consultations (if applicable)

- a) Identify needed expertise to carry out the project
- b) Assign tasks and responsibilities
- c) Establish regular meeting/conference schedule

### 4. Publications and Presentations

- a) Acquire requisite skills (e.g., manuscript preparation, oral presentations)
- b) Establish milestones and target dates
- c) Identify publication outlet/presentation venue
- d) Identify internal reviewers

## Step 3.

Project, Pilot, and Exploratory Awardees complete an IDP by August 15th and submit to both your science mentor and the BPI Coordinator at your institution. Plan to meet with your science mentor before September 1st to discuss your IDP. Prior to September 1st, also solicit input from your BPI Coordinator. Submit your IDP (with suggestions from both the science mentor and coordinator incorporated) by September 1st to VBRN (vbrn@uvm.edu)

## EXAMPLE

## Milestones and Writing Time Table For Writing a Grant

		Writing Time Table <sup>1</sup>
I.	Problem Identification 1. Presentation of research interest. 2. Narrowing down interest into testable hypotheses with mentor 3. Identification of funding sources that fit with hypotheses 4. Identification of target funding source(s) with mentor 5. Obtain information from target funding sources of proposal Formats – check with mentor	12 months
II.	Operationalizing Constructs Presented in Hypotheses 1. Presentation by mentee of their procedures to his/her mentor 2. Feedback from mentor	10 months
III.	Writing the Conceptualization and Procedures 1. Draft the specific aims and significance sections of proposals 2. Draft the method procedures section 3. Draft circulated to mentor 4. Mentors return draft with comments to mentee	8 months 8 months 8 months 7½ months
IV.	Conceptionalization to Operationalization to Data Analysis 1. Draft analysis section 2. Draft circulated to mentor 3. Mentors return draft with comments	6½ months 6½ months 6 months
V.	Mechanics 1. Human Subjects Forms or Vertebrate Animals/IRB Forms 2. Budget – Draft a proposed budget with assistance of mentor 3. Budget Justifications – Draft 4. Prior research and preliminary studies – Draft circulated to mentors 5. Mentors return draft with comments	5½ months 4 months 4 months 3½ months 3 months
VI.	Completed Proposal Circulated to Mentor and Others	2½ months
VII.	Feedback on Completed Proposal from Mentor and Others	2 months
VIII.	Revisions and Elaboration	2 to 0 months
IX.	Final Proposal Ready	Ready!

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<sup>1</sup> Months prior to proposal being ready for submission

# NIH AREA R15 REVIEW CRITERIA

Consider becoming a reviewer! Allow the funding organizations ample opportunity to know you...so that when your grant comes up for review, they can attach a face with the name.

NIH's Early Career Reviewer Program: <https://public.csr.nih.gov/ForReviewers/BecomeARewierwer/ECR>

NSF Reviewer Information: [https://www.nsf.gov/bfa/dias/policy/merit\\_review/reviewer.jsp](https://www.nsf.gov/bfa/dias/policy/merit_review/reviewer.jsp)

The NIH utilizes a 9-point rating scale (1 = exceptional; 9 = poor) for all applications; the same scale is used for overall impact scores and for criterion scores. Each reviewer assigned to an application gives a separate score for each of five review criteria described below.

## **Overall Impact**

Reviewers will provide an overall impact score to reflect their assessment of the likelihood for the project to make useful scientific contributions to the research field(s) involved, to provide research opportunities to undergraduate students by engaging them in primary research activities, and to strengthen the research environment of the institution, in consideration of the following review criteria and additional review criteria (as applicable for the project proposed).

## **Significance**

Does the project address an important problem or a barrier to progress in the field? Is the prior research that serves as the key support for the proposed project rigorous? If the aims of the project are achieved, will the data be publishable and useful to the field? If funded, will the AREA grant have a substantial effect on the applicant institution in terms of strengthening the research environment and exposing undergraduate students to research?

## **Investigator(s)**

Are the PD(s)/PI(s), collaborators, and other researchers well suited to the project? If investigators are in the early stages of independent careers, do they have appropriate scientific experience and training? If established, have they demonstrated an ongoing record of accomplishments that have advanced their scientific field(s)? Do the PD(s)/PI(s) have suitable experience in supervising and engaging undergraduate students in research? If the project is collaborative or multi-PD(s)/PI(s), do the investigators have complementary and integrated expertise; are their leadership approach, governance and organizational structure appropriate for the project?

## **Innovation**

Does the application take advantage of, challenge or build on current research concepts and models or research techniques? Are innovative approaches to engaging undergraduate students in research proposed?

## Approach

Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project? Have the investigators included plans to address weaknesses in the rigor of prior research that serves as the key support for the proposed project? Is the project appropriate for execution primarily by undergraduates? Have the investigators described appropriate plans for how undergraduates will be included as an integral part of the research project? Does the application provide sufficient evidence that the project will likely stimulate the interests of students so that they can consider a career in the biomedical sciences? Are appropriate plans in place to recruit a diverse and inclusive team of undergraduate researchers. Have the investigators presented strategies to ensure a robust and unbiased scientific approach, as appropriate for the work proposed? Are potential problems, alternative strategies, and benchmarks for success presented? If the project is in the early stages of development, will the strategy establish feasibility, and will particularly risky aspects be managed? Have the investigators presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects?

If the project involves human subjects and/or NIH-defined clinical research, are the plans to address 1) the protection of human subjects from research risks, and 2) the inclusion (or exclusion) of individuals on the basis of sex/gender, race, and ethnicity, as well as the inclusion (exclusion) of individuals of all ages (including children and older adults), justified in terms of the scientific goals and research strategy proposed?

## Environment

Are the institutional support, equipment and other physical resources available to the investigators adequate for the project proposed? Does the application demonstrate the likely availability of well-qualified students to participate in the research project? Does the application demonstrate appropriate plans to recruit well-qualified undergraduate students from diverse backgrounds to participate in the research project? Does the application provide sufficient evidence that students at the applicant institution/ academic component have in the past and/or are likely in the future to pursue careers in the biomedical sciences? Does the PD/PI(s) have sufficient time and institutional support to conduct the proposed project?



# CONTACTING THE NIH

## Contacting Staff at the NIH Institutes and Centers

NIH staff is here to help. The best people to talk with you about the scientific or administrative information in your particular application or award are in the NIH institute or center that may fund the grant. We strongly encourage you to communicate with NIH staff throughout the grant life cycle. The information on this page can help you understand the roles of NIH staff and help you contact the right person at each phase of the application and award process.

More info at: <https://grants.nih.gov/grants/how-to-apply-application-guide/resources/contacting-nih-staff.htm>

Role	Responsibility	When to Contact	Where to find contact
Program Officials	Develop research and research training initiatives	To identify the right type of grant program and/or funding opportunity for you and your research	When exploring NIH:  Look at organization charts of each NIH institute or center (IC)
	Write funding opportunity announcements		
	Provide scientific guidance to investigators pre- and post-award	To verify that your idea fits within the mission and priorities of an NIH Institute or Center	Use our Matchmaker tool in RePORTER to find NIH funded grants on topics related to yours. A Program official tab identifies the program officials associated with the matched projects and includes its own filters for Institute/ Center and Activity Code.
	Monitor the programmatic, scientific, and/or technical aspects of a grant	To discuss whether your research is considered a clinical trial	
	Work in partnership with grants management staff on post-award administration, including review of progress reports	For approval to submit an application with budget >\$500,000 direct costs for any single year or an R13 conference grant	After finding an FOA:  Refer to section VII of the FOA for Scientific/ Research Contact(s)
		To discuss the summary statement and outcome of review	After application submission or award:  Look in your eRA account for the assigned program staff contact for your application
		To talk about progress or scientific and administrative issues that arise with the grant after award	

Role	Responsibility	When to Contact	Where to find contact
Scientific Review Officers	Review applications for completeness and conformance with application requirements	Point of contact for applicants during the review process to: <ul style="list-style-type: none"> <li>Discuss the review assignment</li> </ul>	After finding an FOA:  Refer to section VII of the FOA for Peer Review Contact(s)
	Ensure fair and unbiased evaluation of scientific and technical merit  Provide a summary of the evaluation in the form of summary statements for applicants	<ul style="list-style-type: none"> <li>Request permission to send additional/corrective materials</li> <li>Discuss any review concerns (e.g., expertise needed on the review panel, conflicts, reviewers that may have bias)</li> </ul>	After application submission:  Look in your eRA account for the name and contact information for the assigned scientific review officer for your application
Grants Management Officials	Evaluate applications for administrative content and compliance with policy	To discuss financial or grants administration issues	After finding an FOA:  Refer to section VII for Financial/Grants Management Contact(s)
	Negotiate Awards  Interpret grants administration policies	For interpretation of grants policies	After application submission and/or award:  Look in your eRA account for the name and contact information for the assigned grants management staff for your application
Division of Receipt and Referral in NIH's Center of Scientific Review	Evaluate applications for compliance with policy	To identify institutes/centers at NIH or a Scientific Review Group (SRG) that might be appropriate for your application.	When Exploring NIH:  301-435-0715  csdrrr@mail.nih.gov
	Assign applications to institutes/centers or partner agencies for funding consideration  Assign applications to appropriate group for initial peer review	To request a reassignment of an application to an institute, center or review group seems inappropriate, the Program Director/Principal Investigator (PD/PI) may request reassignment in writing.  To officially withdraw an application from funding consideration prior to review.	To request reassignment or withdrawal of an application:  Send an email to csdrrr@mail.nih.gov with an attached letter including: an ink signature of an authorized organization representative, name of contact PD/PI, application number, and the details of the request.

# NIH REPORTER AND MATCHMAKER TOOLS

Here's an easy method to find and contact an appropriate NIH program officer (PO) for your area of science. That PO can advise you on your application ideas and help you navigate the grant submission and review process.

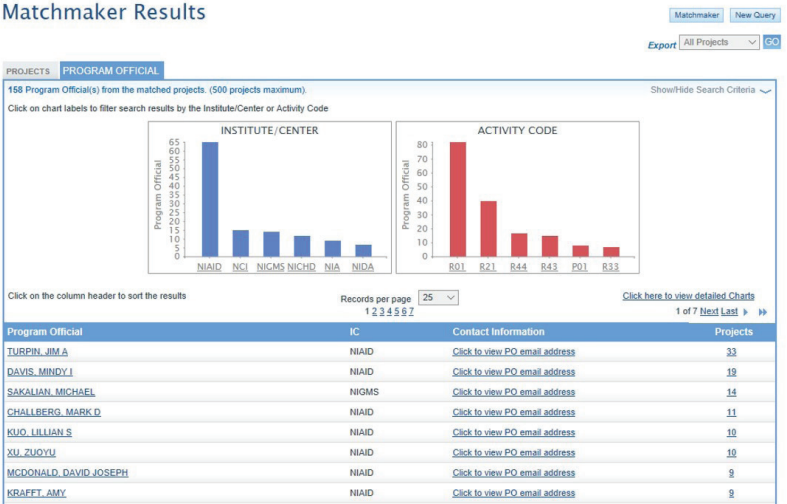
As you may already know, NIH Research Portfolio Online Reporting Tools (<https://projectreporter.nih.gov/reporter.cfm?source=aifn>) provides detailed information on funded projects.

The feature to find a PO is now part of RePORTER. Here's how to locate and use it:

Look at the bottom of the RePORTER search form and find the 'Matchmaker' box. Paste or type any text in the Matchmaker text box such as keywords or a scientific abstract.

Select either "Similar Projects" or "Similar Program Officials" to view the results.

## Matchmaker Results



As shown in the image, Matchmaker will return graphs of relevant NIH institutes or centers and activity codes. Below the graphs, you'll see a table of POs ranked by the number of relevant projects in their portfolios. Click the number in the Projects column to see the list of awards.

Since the tool uses document fingerprinting technology to analyze the text you provide, it may not precisely pinpoint the proper PO. Even so, it's likely that one of your top matching POs can direct you to the right person.

Do not send a single email to all the POs listed in your query results. Instead, view the abstracts of the linked projects first and then direct your question to the PO whose projects most closely match your interests.

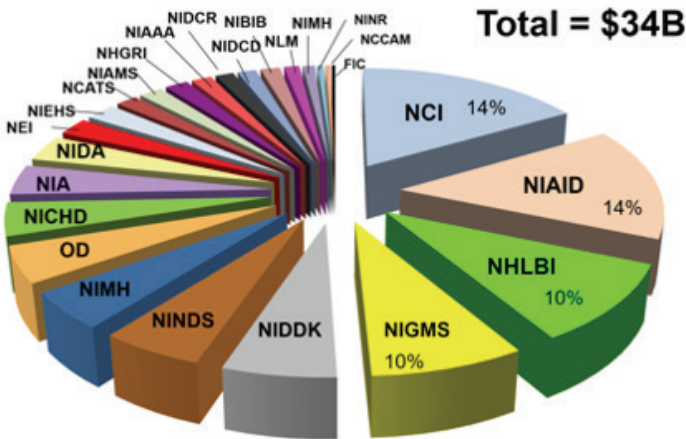
# LIST OF NIH INSTITUTES, CENTERS, AND OFFICES

<https://www.nih.gov/institutes-nih/list-nih-institutes-centers-offices>

NIH is made up of 27 Institutes and Centers, each with a specific research agenda, often focusing on particular diseases or body systems.

NCI	NEI	NHLBI
NHGRI	NIA	NIAAA
NIAID	NIAMS	NIBIB
NICHD	NIDCD	NIDCR
NIDDK	NIDA	NIEHS
NIGMS	NIMH	NIMHD
NINDS	NINR	NLM
CC	CIT	CSR
FIC	NCATS	NCCIH
OD		

NIH FY18 Budget Allocation



# NIH RESEARCH ENHANCEMENT AWARD (R15)

<https://grants.nih.gov/grants/funding/r15.htm>

NIH Sample Applications and Summary Statements: Some NIAID investigators have agreed to share their exceptional applications and summary statements as samples to help the research community. Two sample R15 applications and summary statements can be found at the following link: <https://www.niaid.nih.gov/grants-contracts/sample-applications#r15>

## Definition of an R15

Supports small-scale research projects at educational institutions that provide baccalaureate or advanced degrees for a significant number of the Nation's research scientists but that have not been major recipients of NIH support.

The goals of the R15 are to:

- support meritorious research,
- expose students to research, and
- strengthen the research environment of the institution.

Awards provide limited Direct Costs, plus applicable F&A costs, for periods not to exceed 36 months. This activity code uses multi-year funding authority.

## R15 Changes in 2019

The R15 activity code will be rebranded as "NIH Research Enhancement Award" and will include two programs:

1. Academic Research Enhancement Award (AREA) for Undergraduate-Focused Institutions
2. Research Enhancement Award Program (REAP) for Health Professional Schools and Graduate Schools

An institution letter verifying eligibility with the criteria listed in the funding opportunity announcement will be required with each application and the ineligible institution list will no longer be maintained.

We are no longer posting an AREA/R15 parent announcement. Instead, participating NIH institutes and centers work with a lead institute to post AREA and REAP opportunities.

See [NOT-OD-19-015](#) for additional information.

## Eligibility

Each funding opportunity announcement includes detailed eligibility information that supersedes any general information listed here.

To assist in determining eligibility, organizations are encouraged to use the NIH RePORT website (see Need Help Determining Organization Funding Levels for R15 Eligibility?).

## Organization Eligibility

### Academic Research Enhancement Award (AREA) for Undergraduate-Focused Institutions

- The applicant institution must be an accredited public or non-profit private

school that grants baccalaureate degrees in biomedical sciences.

- At the time of application submission, all the non-health professional components of the institution together have not received support from the NIH totaling more than \$6 million per year (in both direct and F&A/indirect costs) in 4 of the last 7 fiscal years. Note that all activity codes are included in this calculation except the following: CO6, S10, and all activity codes starting with a G.
- A signed letter is required from the Provost or similar official with institution-wide responsibility verifying the eligibility of the applicant institution at the time of application submission.

### **Research Enhancement Award Program (REAP) for Health Professional Schools and Graduate Schools**

- The applicant organization must be an accredited public or non-profit private school that grants baccalaureate or advanced degrees in health professions or advanced degrees in biomedical and behavioral sciences.
- At the time of application submission, the applicant institution may not have received support from the NIH totaling more than \$6 million per year (in both direct and F&A/indirect costs) in 4 of the last 7 fiscal years. Note that all activity codes are included in this calculation except the following: CO6, S10, and all activity codes starting with a G.
- A signed letter is required from the Provost or similar official with institution-wide responsibility verifying the eligibility of the applicant institution at the time of application submission.

### **R15 Principal Investigator Eligibility**

- The PI must have a primary appointment at the R15-eligible institution.
- The PI may not be the PI of an active NIH research grant at the time of a R15 award, though he or she may be one of the Key Personnel for an active NIH grant held by another PD/PI.
  - Instrumentation awards (S10), conference grants (R13), and institutional training grants (T32) are examples of grants that are not considered research grants.
- The PI may not be awarded more than one R15 grant at a time.
- Eligibility applies only to the PI and Multiple PIs, not to collaborators, consultants, or sub awardees.

### **Application Characteristics**

- Project period is limited to 3 years.
- Direct costs are limited to \$300,000 over the entire project period.
- R15 grants are multi-year funded awards. The entire budget, for all years of the award, must be requested in the first budget year.
  - Do not complete budget periods 2 or 3. They are not required and will not be accepted with the application.
- NIH's Modular Budget Policy apply
  - Applicants submitting an application with direct costs of \$250,000 or less (total for all years, excluding consortium Facilities and Administrative [F&A] costs) must use the Modular Budget.

- Applicants submitting an application with direct costs of \$250,001 – \$300,000 (total for all years, excluding consortium Facilities and Administrative [F&A] costs) must use the Research and Related (R&R) Budget form.
- Awards can be renewed by competing for an additional project period.
- The application should propose a research team, including undergraduate and/or graduate students, that is appropriate to accomplish the specific aims and to make an important scientific contribution.

## Due Dates

Standard R15 receipt dates are February 25, June 25, and October 25. AIDS and AIDS-related grant application due dates are May 7, September 7, and January 7. For additional information, the receipt, review and award cycle schedules are posted on: <https://grants.nih.gov/grants/funding/submissionschedule.htm>.

## SUPPORT FOR RESEARCH EXCELLENCE (SuRE) PROGRAM (R16)

This is a new funding mechanism under NIGMS' Division for Research Capacity Building. Currently, Castleton University, Northern Vermont University and Norwich University are eligible institutions. A recorded webinar and slides on this program can be found here: <https://www.nigms.nih.gov/about/overview/Pages/SuRE.aspx>.

VBRN's Program Officer, Dr. Irina Krasnova, is managing this funding opportunity and if faculty have specific questions, they can reach out directly to her ([irina.krasnova@nih.gov](mailto:irina.krasnova@nih.gov)).

The SuRE program supports research capacity building at institutions that enroll significant numbers of students from backgrounds nationally underrepresented in biomedical research (see [NOT-OD-20-031](#)), award baccalaureate and/or graduate degrees in biomedical sciences, and receive limited NIH [Research Project Grant](#) funding. It seeks to develop and sustain research excellence of faculty investigators and provide students with research opportunities while catalyzing institutional research culture and enriching the research environment.

The SuRE program will support investigator-initiated research in the biomedical, clinical, behavioral and social sciences (collectively termed "biomedical" sciences) that falls in the mission areas of NIH Institutes, Centers, and Offices. Research activities funded by the SuRE program require participation by students. Two SuRE R16 Funding Opportunity Announcements (FOAs, [PAR-21-169](#) and [PAR-21-173](#)) have been published to support investigator-initiated research projects. A SuRE Resource Center ([PAR-21-227](#)) will enable broader participation in the SuRE program nationally, thus maximizing the program's impact in developing and sustaining research excellence at eligible institutions.



# HOW VBRN FUNDS UNDERGRADUATE STUDENTS

## **Students Funded by VBRN**

In addition to funding students through faculty Project, Pilot, and Exploratory awards, VBRN supports three students per BPI for summer and/or academic year research with our funded faculty. There is a competitive process specific to the BPI for selecting these students.

## **Undergraduate Student Summer Research Support**

VBRN offers a specific opportunity for students from our BPIs to apply to conduct summer research in a laboratory outside of their home institution, including but not limited to the University of Vermont (UVM), Bia Diagnostics, and the White River Junction Veterans Affairs Medical Center. The application deadline for this undergraduate research experience is in February of each year and more information can be found at the following link: <https://vbrn.org/funding-opportunities/#student-awards>. Applicants must be enrolled as an undergraduate student at any institution the following fall after the summer experience in order to be eligible to apply.

## **Student Requirements of VBRN Funding**

All students receiving VBRN funding are required to present a poster at the annual Career Day event held in April of each year, and to provide contact information in order to participate in annual and long-term career tracking.

# TEACHING RESOURCES

VBRN staff have developed educational modules for undergraduate students in the areas of bioinformatics and proteomics. These resources are freely available and can be used in full or modified to fit the needs of a specific audience.

## **Bioinformatics module:**

This is a four-session online bioinformatics short course that covers topics including: literature searches, sequence databases, sequence similarity searches using BLAST, multiple sequence alignment, phylogeny reconstruction, protein structure databases, and 3D viewers. Each session is designed to familiarize undergraduate students with online genetic sequence databases and tools for use in scientific research. The short course in its entirety is intended for mid- to upper-level undergraduates in a molecular biology, genetics, or biochemistry course. However, the modular design of the online course can be utilized to meet the needs of independent instructors and options are provided to adapt the materials for less advanced students. Although there are many data mining tutorials available, the unique strength of this educational module is the assignment of an independent project that necessitates the use of the data mining tools independently by each student, enhancing student familiarity and competence with the databases and tools that are introduced in the online tutorial (sessions 5 and 6). The resources for these projects are described and can be used separately from the online portion. The short course and independent research projects demonstrate the direct connection between genetic change, protein function, and human (clinical) phenotype.

In order to access this content, you will need to create an account:

<https://vbrn.org/education>

Then contact Heather Driscoll ([hdriscol@norwich.edu](mailto:hdriscol@norwich.edu)) for enrollment in the public version of the course or to create a custom instance for your private use.

Additional bioinformatics teaching resources can be found in the following publication:

Murray, J., Driscoll, H. E., and Pivarski, K. (2018). Connecting human disease phenotype to genetic mutation and protein function: A modular data mining short course with an independent project sequence for lecture or lab. Genetics Society of America Peer-Reviewed Education Portal (GSA PREP); 2018. 005; doi: 10.1534/gsaprep.2018.005.

<http://www.genetics-gsa.org/education/GSAPREP.2018.005.shtml>

## **Proteomics module:** <https://vbrn.org/proteomics-outreach/>

The goal of this module is to expose undergraduates in Vermont to proteomics technology using hands-on laboratory experiences. In this series of experiments, students will learn how protein expression in yeast is changed after exposure to oxidative stress or an environmental toxin. Proteins with differential expression will be isolated from a 2D gel and prepared for Mass Spectrometry at the VBRN Proteomics Core. Once the data are processed, students examine their results and use bioinformatics to understand the biological implications of their results.

# VBRN CORE FACILITIES

## BIOINFORMATICS CORE

<https://vbrn.org/bioinformatics>

### OUR CORE

The VBRN Bioinformatics Core provides comprehensive support for investigators across our network whose research requires biological information data analysis.

### OUR SERVICES

#### Genomics and Transcriptomics

- Experimental design, power analysis, differential expression analysis, linear mixed model, variance analysis, clustering, and hypothesis testing for microarray and RNA-Seq data
- RNA-Seq analysis (alignment, quantification & differential expression)
- Microarray data differential expression and copy number analysis
- ChIP-seq data analysis

#### Biological Interpretation

- Functional group enrichment analysis – enrichment analysis of genes, motifs, structural domains and post-translational modifications.

#### Grant Proposal and Publication Support

- Data publishing– data deposition into public repositories
- Grant proposal and manuscript support– bioinformatics methods and results text, figure, and table preparation

## PROTEOMICS CORE

<https://vbrn.org/proteomics>

### Hours

Monday – Friday  
9 AM – 5 PM

### Location

University of Vermont  
Marsh Life Science Building  
Rooms 333, 335, and 337

## OUR CORE

The VBRN Proteomics Facility enables investigators to use an array of state-of-the-art mass spectrometry-based techniques for proteomics experiments, ranging from routine protein identification and characterization of post-translational modifications and protein interactions, to large-scale quantitative proteomic analyses using stable isotopes. Since its inception in 2006, the facility has analyzed close to 20,000 samples as well as supported 170+ publications and 50+ grants from NIH, NSF, DOD, USDA, UVM and various Foundations.

The facility is equipped with five mass spectrometers (Orbitrap Fusion Tribrid, Q-Exactive Plus, LTQ Orbitrap Discovery, LTQ, and LTQ-XL equipped with electron transfer dissociation) and a hydrogen deuterium exchange workflow station for conducting structural proteomics. Working closely with the VBRN Bioinformatics Core, Proteomics Facility staff provide tailored bioinformatic solutions to investigators. The facility also trains investigators in experimental design and proteomics methods, while assisting with data interpretation, manuscript preparation, and grant submission.

## OUR SERVICES

- Protein identification and isoform characterization
- Identification of protein-protein interacting partners
- Identification of post-translational modifications (e.g., phosphorylation, methylation, acetylation, trimethylation, S-nitrosylation, glutathionylation, ubiquitylation, S-sulfenylation, etc.)
- Peptide fractionation and enrichment from complex mixtures:
  - Off-line peptide separation (e.g., SCX and high pH fractionation)
- Enrichment of post-translationally modified peptides:
  - Phosphopeptide enrichment (e.g., IMAC, TiO<sub>2</sub>, P-Tyr-100 Ab, 4G10 Ab, p-PKA substrate Ab)
  - Acetylated peptide enrichment (e.g., PTMScan Acetyl-Lys Motif (Ac-K))
- Large-scale quantitative proteomics using stable isotopes:
  - Stable Isotope Labeling by Amino acids in Cell culture (SILAC)
  - Dimethyl labeling
  - Tandem Mass Tags
- Absolute quantification of proteins using isotopically labeled standards
- Quantification of target peptides using Parallel Reaction Monitoring and Skyline
- Analysis of isotope-coded cross-linked peptides for structural proteomics

# HOW TO CITE VBRN FUNDED RESEARCH

The NIGMS of the NIH, which funds the Vermont Biomedical Research Network, requires that we acknowledge them as the source of funding that supports your work whenever you publish papers, chapters, abstracts or otherwise present your work. Please help us to comply with their requirement by using the citation below for our INBRE grant.

## **Citation For Any Presentation or Publication of VBRN Funded Research from 1/1/2012–05/31/2022**

Research reported in this (publication, project, release) was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103449. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIGMS or NIH.

## **Citation For Any Publication That Used VBRN Core Facilities (Proteomics, Bioinformatics) from 1/1/2012–05/31/2022**

Research reported in this (publication, release) was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103449. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIGMS or NIH.

**\*\***You may also add specific details related to the core facility you worked with. For example, "All target preparation (or other analyses, etc.) were performed in the VBRN Proteomics Facility".

# NIH PUBLIC ACCESS POLICY

The NIH enforces a federal law requiring all NIH-funded research to meet the NIH public access policy upon acceptance for publication in a journal (<https://publicaccess.nih.gov>). Utilizing VBRN resources in your work and citing the VBRN grant number will trigger this requirement. Submitting the work to PubMed Central (PMC), either as the accepted, peer-reviewed manuscript or the final published article, meets this requirement.

If publications are not in compliance with the NIH public access policy, NIH can withhold funds from VBRN. Additionally, any of your grant applications containing citations of previous works that were in any way funded by the NIH must comply with the NIH public access policy or the grant budget will be withheld. Ensuring that your research publications comply with the public access policy at the time of publication will facilitate this part of your future grant applications.

Submissions can be made by a coauthor, a designee of an author, or the journal on behalf of an author. Note, NIH requires NIH-supported research articles be deposited in PMC even if the article is open access and freely available in another database. NIH maintains a list of journals that submit articles to PMC automatically on behalf of authors. For journals that do not automatically submit on behalf of authors, it is your responsibility to make certain this requirement is met.

To identify which of four method(s) to use for depositing your VBRN-supported manuscript into PMC follow this handy submission method identification wizard [available on the NIH public access policy page](#). The methods, briefly, are as follows:

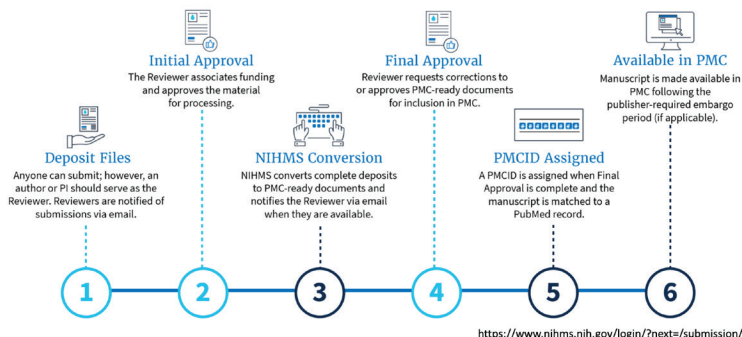
- For Method A, the journals post the final published version of all peer-reviewed NIH-funded articles to PMC no later than 12 months after publication without author involvement. For more information see <https://publicaccess.nih.gov/method-A-BP.htm>.
- For Method B, journals do not automatically deposit every NIH-funded paper in PMC. Rather, the author can choose to arrange with the journal for the deposit of a specific article. This usually involves choosing the journal's fee-based open access option for publishing that article. Please contact the respective journals directly for details on their programs. For more information on Method B see [https://publicaccess.nih.gov/select\\_deposit\\_publishers.htm](https://publicaccess.nih.gov/select_deposit_publishers.htm).
- For Methods C and D, your manuscript should be submitted to PMC through the National Health Manuscript Submission System (NIHMS). In Method C, the author or a delegate deposits the accepted, peer-reviewed manuscript into the NIHMS. In Method D, the publisher deposits the accepted peer-reviewed manuscript into the NIHMS. Regardless of who starts and manages the submission process, authors and awardees are responsible for ensuring that the accepted, peer-reviewed manuscript is deposited into the NIHMS upon acceptance for publication. Submissions need to be completed within 90 days of the article's official date of publication in order to be compliant with the NIH public access policy. For more information on Methods C and D see <https://publicaccess.nih.gov/Methods-C-D-BP>.

## Methods C and D steps:

Step-by-step guidelines for submitting your manuscript via NIHMS (Method C and D submissions) are listed below and elaborated on in a [series of tutorials provided by NIHMS](#) as well as in their [FAQ page](#).

# The NIHMS Process

Manuscript deposit via NIHMS is a multi-step process that takes approximately 2 to 3 weeks following initial approval of a complete submission. Processing times may vary depending on Reviewer responsiveness and the volume of submissions during a given period.



1) Deposit files: a manuscript may be submitted by the author, the PI, the publisher, or another third party. Third-party submitters must designate an author or PI to serve as the Reviewer for an NIHMS submission. In these cases, the Reviewer will receive notification of the deposit via e-mail. Note, an eRA Commons ID or myNCBI ID is needed for the submission.

2) Initial approval: the Reviewer reviews the submission, confirms or adds associated funding, and either rejects or approves the material for processing in NIHMS.

3) NIHMS conversion: NIHMS staff reviews the approved files for completeness, and complete submissions are converted to archival XML. The PMC-ready documents (Web and PDF versions) are checked to ensure they accurately reflect the submitted files. Processing time for this step is usually 2–3 weeks but may vary depending on the volume of submissions at a given time. An e-mail notification is sent to the Reviewer when the record is available for final review.

4) Final Approval: the Reviewer reviews the PMC-ready documents (Web and PDF versions) and either requests corrections or approves them for inclusion in PMC. Final Approval is required to complete manuscript processing in NIHMS.

5) PMCID assigned: a PMCID is assigned when Final Approval is complete and the manuscript is matched to a PubMed record with complete citation information.

6) Available in PMC: the manuscript is made available in PMC following the publisher-required embargo period (if applicable).

Please email VBRN ([vbrn@uvm.edu](mailto:vbrn@uvm.edu)) with any questions you may have about this policy or the process of depositing your manuscript into PMC. We are here to help!

\* If publications are not in compliance with the NIH public access policy, NIH can withhold funds from VBRN. Additionally, any of your grant applications containing citations of previous works that were in any way funded by the NIH must comply with the NIH public access policy or the grant budget will be withheld. Ensuring that your research publications comply with the public access policy at the time of publication will facilitate this part of your future grant applications.

# FREQUENTLY ASKED QUESTIONS

## Can I use core facilities other than VBRN core facilities at UVM?

Yes, you can contact other UVM Core facilities directly to inquire about their services. Check out the new Core Marketplace searchable database on the VBRN web site (<https://coremarketplace.org>) for other facilities. These facilities charge for their use and most have mechanisms to work with outside users. Although VBRN does not have arrangements to offer faculty at our BPIs special pricing or discounts on their services, unlike at the VBRN-run Proteomics and Bioinformatics Cores, VBRN has committed funds to support use of core facilities in the UVM College of Medicine by our BPI faculty. This support is available through the BPIs; contact your VBRN Coordinator for more information.

The screenshot shows the Core Marketplace website. At the top is the logo with the text "CORE MARKETPLACE" and navigation links: SEARCH HELP, POSTINGS, LISTING WIDGET, NEWS, MANUAL. Below the logo is a dark bar with "START OVER" and "ADD/EDIT MY FACILITY" links. A search bar with the placeholder "SEARCH THE COREMARKETPLACE" and a magnifying glass icon is present. The "POSTINGS" section follows, with a description: "Postings are requests for specific facility services or configurations to address research needs. Listed facilities may also post services offered to researchers." There are two example postings. The first, "Service Offered: Example Offer" (dated 04/15/2021), lists contact as "Nate Herzog" and includes a note that it's an example offer. The second, "Service Wanted: Example Posting" (dated 04/12/2021), lists contact as "Anonymous" and includes a note that it's an example request. A note states "Postings are active for two months after the date of posting." with a "View More" link. At the bottom, it says "The CoreMarketplace is a joint venture with:" followed by logos for "VBRN", "RRID", and "USEDit". A footer contains links for "Contact", "About", "Sitemap", and "Help".

## Why can't VBRN help us with equipment purchases?

We do not have the staff or ability to help BPIs with their purchasing. Each BPI has a subcontract and professional staff who can help you.

## Are Preprints taken into account at the NIH?

The NIH's policy on reporting preprint and other interim research products can be found at <https://grants.nih.gov/grants/guide/notice-files/not-od-17-050.html>

## Can I use the UVM Library for electronic journals?

The University of Vermont is charged for use of journals by numbers of UVM IDs and cannot allow persons outside UVM to access their electronic holdings. You would have to become an adjunct faculty member at UVM.



# VBRN CALENDAR OF EVENTS

The current funding cycle is from June 1, 2021– May 31, 2022.

**August 16–18** – Northeast Regional IDeA Conference (NERIC)

**August 19, 2021** – Online Faculty Retreat

**September 1, 2021** – IDP due

**September, 2021** – Funded Faculty IDP phone call

**November 6, 2021** – Online Grant Writing Workshop

**December 1, 2021** – VBRN Award Letter of Intent due

**December 1, 2021** – VBRN Award application site open

**January 2022** – RPPR due

**February 1, 2022** – VBRN Award applications due

**February 1, 2022** – Science Mentor Report due

**February 2022** – Undergraduate Student Summer Research Support application due

**March 26, 2022** – Professional Development Workshop

**April 13, 2022** – Career Day

**May 1, 2022** – Science Mentor Report due

**June 1, 2022** – VBRN Award compliance (e.g. extramural proposal/manuscript submission) due

**Summer 2022** – Faculty Retreat

