

SPARC Reconstructing Vagal Anatomy (REVA)

Solicitation informational webinar

75N98022-SPARC-RFP-28Jan22

To submit questions during the webinar, please use the chat. We will address questions at the end of the presentation. Following the conference, questions can be sent to SPARC-V@od.nih.gov

NIH SPARC REVA Team

Tyler Best, *Office of the Director (OD)*

Kristina Faulk, *OD*

Wendy Knosp, *OD*

Katelynn Milora, *OD*

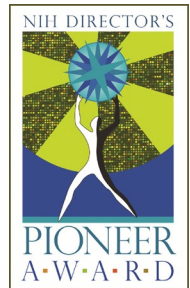
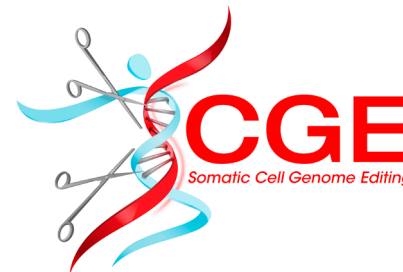
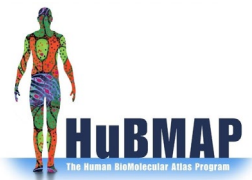
Felicia Qashu, *OD*

Karen Teff, *National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)*

Andrew Weitz, *National Institute of Biomedical Imaging and Bioengineering (NIBIB)*

NIH Common Fund Programs

- Transformative** Must have the potential to dramatically benefit biomedical and/or behavioral research
- Catalytic** Must achieve a defined set of goals within 5-10 years
- Synergistic** Outcomes must synergistically advance individual missions of Institutes and Centers
- Cross-cutting** Program areas cut across missions of multiple Institutes and Centers, requiring a coordinated approach
- Unique** No other entity is likely or able to do



New SPARC Initiatives

SPARC-V: Human vagus nerve mapping and physiology

- *Reconstructing human vagal anatomy*
 - Solicitation ID: "[75N98022-SPARC-RFP-28Jan2022](#)" on sam.gov
 - **Proposals due April 4, 2022 at 3pmET**
- *VNS Endpoints from Standardized Parameters (VESPA) Center (U54) will implement a large multisite clinical study of the multi-organ effects of vagus nerve stimulation*
 - **RFA-RM-22-002** ➡ **Applications due April 1, 2022**

SPARC-O: Open-source neuromodulation technologies

- *Human Open Research Neural Engineering Technologies (HORNET) Centers (U41) will create interoperable open-source modules that can be combined into custom profiles for neuromodulation studies*
 - **RFA-RM-22-002** - Applications due January 12, 2022

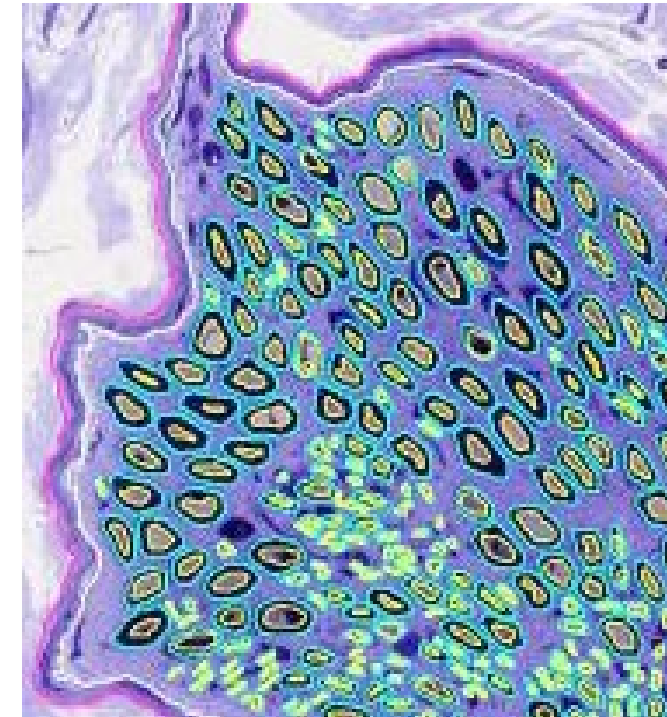
SPARC-X: Neuromod Prize

- *Competition to incentivize selective neuromodulation of multiple outcomes without off-target effects*
 - **Neuromodprize.com** ➡ **Submissions due April 28, 2022**

Reconstructing Vagal Anatomy (REVA)

- The vagus nerve connects to many organs
 - Parasympathetic motor fibers from the brainstem to numerous visceral organs
 - Sensory fibers from these visceral organs to the brainstem
 - Sympathetic hitch-hikers to/from the spinal cord

How vagal axons and fascicles are organized within the nerve can impact the efficacy or adverse outcomes of neuromodulation therapies



Havton, et al.

<https://dx.doi.org/10.1038%2Fs41598-021-03248-1>

REVA Goals and Objectives

Inform neuromodulation strategies that target specific vagal sub-circuits to improve clinical outcomes in VNS trials

- Characterize how the axons and fascicles within the human vagus nerve are organized along its length and branches
- Assess extent of anatomical variability among individuals
- Generate circuit-level schematics, similar to a subway map, of vagus nerve-organ connectivity with at least fascicular resolution, using male and female vagal specimens from across the lifespan

REVA Objectives

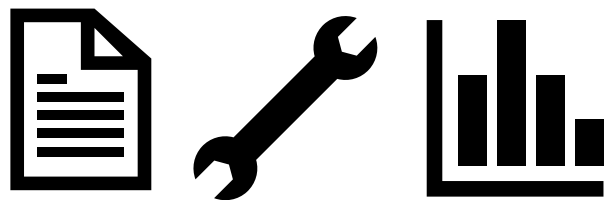
Establish the Data Analysis and Visualization Epicenter (DAVE)

Administrative and Program Management

Specimen Processing and Data Acquisition

Data Sharing

Establish the Data Analysis and Visualization Epicenter

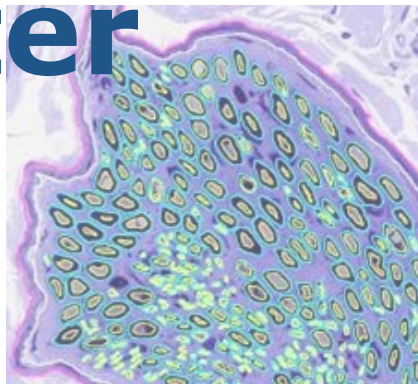


Develop SOPs in coordination with partnering sites.

Develop and/or adapt existing tools/code to **automate, expedite, and/or facilitate data analysis, processing, and development of visualizations.**

Perform pilot studies (including animal studies, as appropriate) and/or sensitivity/power analyses to determine final target sample numbers and/or the final technical or methodological approach.

Establish the Data Analysis and Visualization Epicenter



Havton, et al.

<https://dx.doi.org/10.1038%2Fs41598-021-03248-1>

Define the characteristics of the human vagus:
Type and size of axons, myelin, epineurium, and perineurium; if afferent or efferent; other neurochemical phenotypes

How axons and fascicles are organized along the length of the nerve

By target organ, vagal branch, axon type, afferent/efferent

Merging and diverging among fascicles

Extent of anatomical variability by sex, age, laterality

Establish the Data Analysis and Visualization Epicenter



Curate existing data and knowledge on the anatomy and connectivity of the human vagus to incorporate into detailed visualizations along with new data.

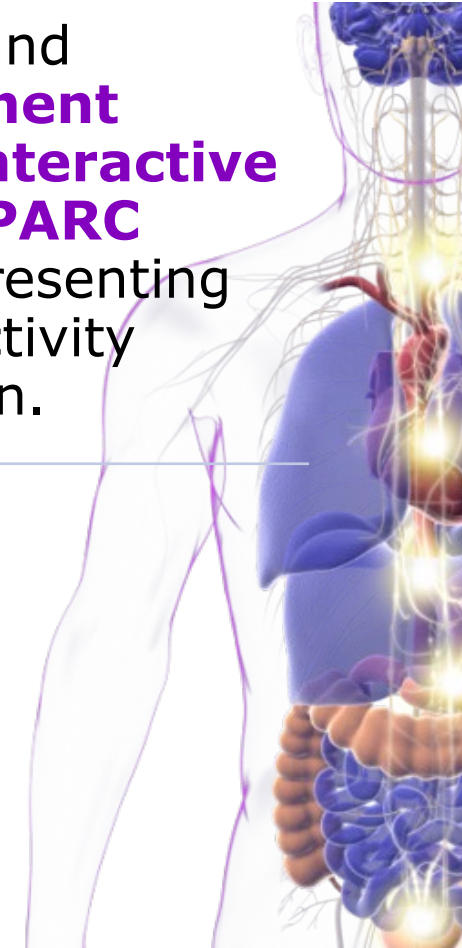
Reconstruct and co-register imaging data for digital, computational, visual, and statistical-based exploration and analysis of vagal nerve-organ connectivity profiles spanning the gross anatomical to axon levels.

Incorporate anatomical variability across individuals and segmentation of fascicles along the nerve and across branch points.

Image credit: Jonathan Simmons, MD @jsimmo02

Establish the Data Analysis and Visualization Epicenter

Coordinate with the SPARC Data and Resource Center (DRC) to **implement vagal connectivity maps and interactive 2D/3D visualizations on the SPARC Portal** (<https://sparc.science>) representing an “average” human vagal connectivity map, as well as individual variation.



Administrative and Program Management



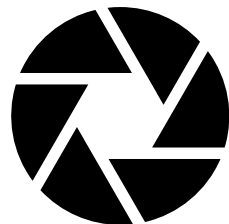
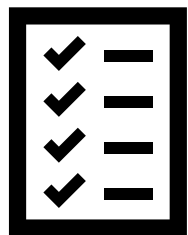
Enter into **agreements** with suppliers **to obtain human specimens** that represent the sex, race/ethnicity, and ages of the U.S. population.

Ensure specimen dissection and/or handling enables collection of required fiducial documentation.

Obtain appropriate approvals for use and disposition of specimens.

Provide **program management: track progress** towards milestones and deliverables, monitor SOP compliance, manage risks, and **report updates to the NIH.**

Specimen Processing and Data Acquisition



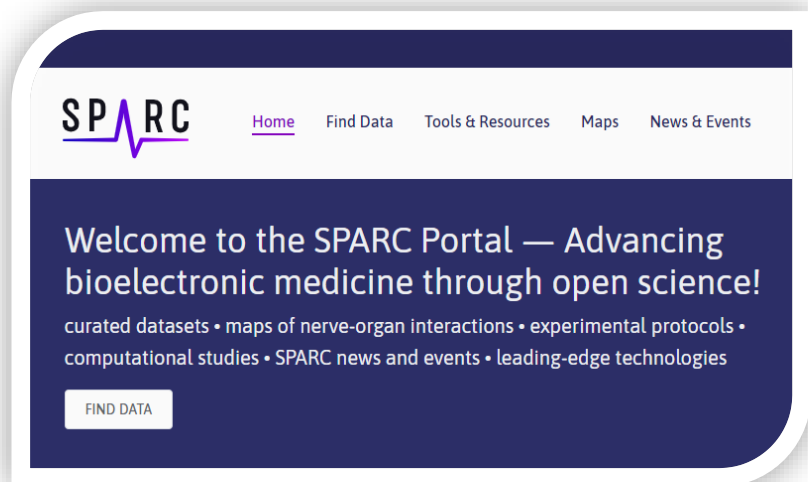
Maintain documentation of relevant **anatomical features and fiducial information** needed for analysis and visualizations.

Image the human vagus nerve along its entire length from the brainstem through to its branches that innervate specific organs.

Resolution must be sufficient to allow segmentation and tracking of nerve fascicles and organization

Dissect, section, process, and **image sections of the human vagus** at branching points, potential sites for neuromodulation device implantation.

Data Sharing



Upload raw and processed data to the **SPARC Data and Resource Center (DRC)**, in accordance with SPARC DRC guidance and processes, for sharing publicly via the **SPARC Portal**.

Share source code/tools and other relevant documentation of segmentation and image processing methods via the SPARC Portal, unless otherwise prohibited by pre-existing licenses.

Deliverables Schedule

- Attachment 04 of the RFP

Task No.	Deliverable Title	Due Date (from date of contract execution)
1	Program Management/Admin	
1.a	Kickoff meeting	1 week
1.b	Partner agreements and/or executed sub-contracts	2 months
1.c	SOPs and quality assurance plans for management of human specimens and sample processing	3 months
1.d	Documentation of the image collection and sharing pipeline	6 months
1.e	Workflow for curating existing knowledge on detailed vagal-organ connectivity	6 months
1.f	Data processing, analysis, and co-registration pipeline	12 months
1.g	Progress reports to the NIH	monthly
2	Specimen procurement	
2.a	Agreements and approvals to procure and use human samples	6 months
2.b	Documentation of demographics of human donors of vagal	18 months

By the end of the 3-year period:

- Raw and processed data, reconstructions, and metadata
- Source code and other relevant tools for image processing/analysis
- Results from analysis of variability
- Final 2D/3D visualizations of human vagal connectivity implemented on the SPARC Portal

Proposal Instructions

- Part IV, Section L

COVER PAGE	Include RFP title, number, name of organization, DUNS No., identification of the proposal part, and indicate whether the proposal is an original or a copy.
TECHNICAL PROPOSAL	Cover page, a table of contents, and the information requested in the Technical Proposal Instructions (page 29 of 54 in the pdf)
BUSINESS PROPOSAL	cover page, a table of contents, and the information requested in the Business Proposal Instructions (page 33 of 54 in the pdf)

Proposal Submission

- Proposals shall be submitted via the NIH Electronic Contract Proposal System (eCPS) at <https://ecps.nih.gov/>
- Creating a new account may take 3 business days

The screenshot shows the NIH eCPS website homepage. At the top left is the NIH logo. To its right is the text "electronic Contract Proposal Submission". Below this is a navigation menu with links for "HOME", "ABOUT", "HOW TO SUBMIT", "FAQ", and "CONTACT". The main heading reads "Welcome to NIH's electronic Contract Proposal Submission (eCPS)". Below the heading is a paragraph: "The electronic Contract Proposal Submission (eCPS) is a component of NIH's integrated, secure system for the electronic submission, capture, tracking and review of contract proposals." On the right side, there is a call to action "Ready to submit a proposal?" with a button for "eCPS Login" (which includes a lock icon) and a link for "Register new account >".

Proposal Submission

- Attachment 01
- Technical Proposal - 100-page limit, of that, 20-page limit to address the Statement of Objectives (Attachment 03 of the RFP)
- Business Proposal
- File naming convention: filenames for your Technical Proposal, Business Proposal, and Excel Workbook include the name of the offeror, the solicitation number and the type of proposal
 - Examples:
 - Technical Proposal: XYZ Company_75N98022-SPARC-RFP_Technical.pdf
 - Business Proposal: XYZ Company_75N98022-SPARC-RFP_Business.pdf
 - Excel Workbook: XYZ Company_75N98022-SPARC-RFP_Business.xlsx

Proposal Intent

A proposal intent may be submitted to the Contracting Officer (louis.kuta@nih.gov) by the earliest practical date.

An expression of intent is not binding but will greatly assist NIH in planning for proposal evaluation.

Please include information according to Attachment 02:

- If you intend or do not intend to submit a proposal
- If you are not responding to the RFP, provide your reason(s)
- Name(s), title, organization, and email
- Number and title of this solicitation:
 - 75N98022-SPARC-RFP-28Jan22
 - Reconstructing Vagal Anatomy (REVA)

Technical Evaluation

- Part IV, Section M
- Attachment 05

Scientific and Technical Merit	60 points
Key Personnel	20 points
Facilities	20 points

Score	Adjectival	Description
76-100	Good	Exceeds all the minimum requirements of the criteria; has an above average probability of success; contains no significant weaknesses and only minor, correctable weaknesses exist.
61-75	Acceptable	Meets all the minimum requirements of the criteria; has an average probability of success; no significant weaknesses and any deficiencies can be readily corrected
51-60	Marginal	Fails to meet one or more of the minimum requirements of the criteria; low probability of success; major weaknesses and/or significant number of deficiencies exist.
0-50	Unacceptable	Fails to meet any of the minimum requirements of the criteria; proposal needs major revisions; very low probability of success.

REVA Solicitation: Key Info

Applications due: April 4, 2022 by 3pm EDT

Proposal intent due: earliest practical date

1-year base period (est 01Jul2022-30Jun2023)

Two option periods (est through 30Jun2024 and 30Jun2025)

1-2 contract awards anticipated

Cost-reimbursement type Completion contract

Resources

NIH Common Fund: SPARC program

<https://commonfund.nih.gov/sparc>

SPARC Portal

<https://sparc.science>

Human Tissue and Organ Research Resource (HTORR)

<https://www.niaid.nih.gov/research/human-tissue-organ-research-resource>

Contact us:

SPARC-V@od.nih.gov
louis.kuta@nih.gov

 commonfund.nih.gov

 [@NIHCommonFund](https://www.facebook.com/NIHCommonFund)

 [@NIH_CommonFund](https://twitter.com/NIH_CommonFund)



National Institutes of Health

Office of Strategic Coordination – The Common Fund