F30/F31/F32/F33 Review

Applicant:

# Overall Impact

Reviewers will provide an overall impact score to reflect their assessment of the likelihood that the fellowship will enhance the candidate’s potential for, and commitment to, a productive independent scientific research career in a health-related field, in consideration of the following scored and additional review criteria. An application does not need to be strong in all categories to be judged likely to have a major impact. *See BIOTRAIN 720 review criteria rubric for guidance in evaluating proposals and writing critiques.*

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| Overall Impact/Merit *Write a paragraph summarizing the factors that informed your Overall Impact score.* |
| Vagus nerve stimulation has a lot of clinical applications to treat diseases such as epilepsy and depression. However, current treatments are based on extrusion models that only consider the 2D structure of the vagus nerve. This proposal will develop 3D models of the vagus nerve, which will allow for more accurate stimulation of the vagus nerve. This research shows a lot of potential in improving clinical treatment using VNS. Moreover, the applicant shows strong expertise in VNS modeling. Two minor concerns are the interdependence of aim 2 and aim 3, and the fact that aim 3 requires data that is not yet available. |

# Review Criteria

Reviewers will consider each of the review criteria below in the determination of the candidate’s qualifications, scientific and technical merit of the proposed research, candidate’s training potential, and institutional environment and commitment to training.

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| 1. Significance |
| **Strengths**   * Clear explanation of the clinical significance of VNS * Current VNS has many side effects that could potentially be avoided with more accurate treatment * Extrusion models make assumptions that are not physiologically accurate * Aims to build 3D models to allow for more targeted treatments via VNS * Open-source software (ASCENT)   **Weaknesses**   * Future work will be needed to design better electrodes that can utilize 3D models * The applicant states that this project will extend ASCENT to include 3D models. However, it is not stated how much this software is used by researchers outside of the lab. The significance of this project would be clearly restricted if its use were to be limited to other lab members. |

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| 2. [Innovation](http://grants.nih.gov/grants/peer/critiques/rpg_D.htm%23rpg_03) |
| **Strengths**   * Study goes beyond extrusion models and models the 3D structure of vagus nerves * Study models fascicles as a connected network instead of separated subunits   **Weaknesses**   * None |

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| 3. Approach |
| **Strengths**   * Strong preliminary data for Aim 1. The author shows that their methods is already up and running. * Clear description of methods. The applicant demonstrates a solid expertise in VNS modeling * Access to large computational resources, and the applicant offers sound alternatives if these resources are not enough.   **Weaknesses**   * The aims are somewhat dependent on each other. If aim 2 fails, then its not clear they can execute aim 3. * Aim 3 depends on future data from collaborators and lab members, which is outside of the applicant’s control. It is not clear how long the applicant expects this data collection to take. * The figures are convoluted, and it is difficult to grasp the big picture from each of them. * Some acronyms (e.g. EMG, MUSE, COSMOL, NEURON) are not clearly defined, which makes the approach harder to follow. * There is a variable typo in the legends of Equation 1. |

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| Resubmission |
| Comments (if applicable): |