Request for Technology Fee Funds: FY18
NOTE: A separate request should be made for each initiative.

I.   **Department Number/Department Name:** | 360 | College of Computing, School of ECE

Title of Request *(please be brief):* | Instructional High Performance Computing Expansion

Amount of Request *(formula from detailed budget below):*   **$77,063**

Are there any installation/renovation costs associated with this request?   ☐ **Yes**   ☑ **No**

   If "Yes" then indicate the source of approved funding:

   (Note: Tech Fees are not allowed for installation/renovation)

Executive Summary of Request (100 words or less):

The College of Computing and OIT-PACE are joining forces to build a shared educational cluster for Georgia Tech to provide a campus resource and model that other departments can join with their own educational funds in the future. This cluster will complement the growing number of HPC resources requested by classes in the College of Computing and the School of ECE, while allowing us to retire the instructional load on the aging Jinx Research and Instruction HPC cluster.

Specific class and/or lab initiative(s) if applicable: | (see Part III of narrative and continuation section)

Contact person for this request (incl. phone #): | Mercer (5-2518), Leonard, Riley (4-4767), Vuduc

Indicate priority per department if applicable: Number _____ of _____

Indicate priority per college or unit: Number __1__ of __9__

II.   **Impact on Students -** Provide course title, course number, and anticipated enrollments:

Titles/Numbers of Course(s) | (see Part III of narrative and continuation section)

Anticipated Enrollments		
Graduate:	*595*	○ per sem ● per year
Undergraduate:	520	○ per sem ● per year
Total:	1,115	(select one)

   NOTE: Other impacts on students should be described in narrative.

III.   **Narrative -** *Provide narrative justification for your intended use of the technology fee funds. Include narrative on how the education or research of the students will be enhanced. Also include how the request aligns with the Strategic Plan of Georgia Tech. Continue in the block below if necessary.*

This proposal is a continuation of last year's Tech Fee proposal "Instructional High Performance Computing Expansion". We were asked to resubmit this year to request the funding for the remaining computer nodes that were not awarded. From last year's proposal -

The CoC and PACE teams at GT have agreed to join forces to build an advanced shared educational computation cluster to serve the entire campus, namely "PACE-ICE: (I)nstructional (C)omputing (E)nvironment". This collaboration eliminates replication of efforts and significantly lowers initial investment and management costs by combining existing CoC Tech Fee funds (FY2016) and new proposals by CoC and PACE. The PACE team will undertake the installation and management of the cluster during its expected 5 years of lifetime (and beyond as a best effort). PACE has significant experience in managing High Performance Computing (HPC) resources for the entire GT campus, including hardware, software, and consultation. More than 1750 active GT researchers from a wide variety of disciplines rely on PACE services on a daily basis for pursuing advanced computational research. Furthermore, PACE data centers readily offer the entire needed infrastructure, such as power, cooling and networking, at no additional cost.

IV.   **Detailed Budget - Requested Items by Category** *List separately any equipment, software, and other allowable expenses (see Tech Fee Guidelines). There is a formula in the "total column" that multiplies the number of items times the unit price. You may enter a figure into the total column if the unit pricing is not applicable. If you need additional rows, contact the Budget Office to receive a modified form.*

Supporting documentation is required *- Include price justification in some form, such as quotations, published price lists, etc. as a separate PDF attachment. All supporting information should be in a single PDF.*

	Proposed Number of Items	Estimated Price per Unit	Total ($)
Compute Nodes	7	$10,794	$75,558
Infiniband Cables	7	$215	$1,505
Total *(linked to the total amount of request line above)*			**$77,063**

Please return form via e-mail in Excel format to: tina.clonts@business.gatech.edu. Supporting information only in a PDF file.

III. Continuation of narrative justification, if necessary

Each GT student needs to develop computational skills to be successful in their lives and careers, regardless of their background or major. CoC and PACE are committed to facilitating and contributing to computational education efforts on campus in line with GT's strategic plan, which strongly encourages leveraging technology to enhance knowledge transfer and learning, to prepare students for unprecedented changes in science and technology applications.

The classes expected to use the proposed cluster improvements include CSE6140, CSE6220, CSE6221, CSE6230, CSE6236, CSE6730, CSE6740, CS1372, CS4140/6140, CS4225, CS4245, CS4335, CS7641, CS4290, CS6220, CS6290, CS8803, CS4225, CS6210, ECE2035, ECE2036, ECE3020, ECE4100/6100, ECE8893, ECE6101, ECE6110, and MATH4777, as well as others from Chemistry, Physics, ME, CEE/Biology, Biology, Nuclear and Radiological Engineering.

Georgia Tech's strategic plan sets goals to be among the most highly respected technology-focused learning institutions in the world and to sustain and enhance excellence in scholarship and research. To our knowledge, the existing CoC instructional HPC facilities are unique on campus. Originally funded by Technology Fees, the JINX HPC cluster provides instructional access to an increasingly common heterogeneous architecture of high performance stream processing capability via its GPUs coupled with standard CPUs, interconnected with high performance networking, and attached to large file systems. The cluster has performed well and has been a valuable resource for multiple units on campus, with interest growing with each semester, but due to increasing age (funded in FY11) and the advancement of GPU technology, it is time for an upgrade, allowing us to retire the aging and increasingly problematic JINX cluster from academic use. Replacing the entire cluster is a large investment, so with that in mind, we split the upgrade into three stages. This is the third stage of the process and will allow us to decommission the instructional use of that resource and move it fully to research. The first year we purchased non-GPU compute nodes, which now serve as Deepthought, a resource that would serve as the core of a new, CoC-specific instructional HPC cluster. However, when the opportunity arose to work with PACE on PACE-ICE, we decided to change course to expand the reach of the final resource across campus. As such, last year's Tech Fee grant was used as the seed money for PACE-ICE to purchase half of the GPU nodes for the new cluster. This year we propose to replace the other half of the GPU nodes for the CoC's portion of the final PACE-ICE cluster.