Henry Ford Community College
Technology Investment Fund
Project Funding Request

This application form with original signatures must be received by the Vice President/Controller's office by 4:00 p.m. on either **the first Friday after Labor Day** (Fall semester) **or the third Friday in January** (Winter semester) in order to be eligible for funding. Applications will only be accepted on this form. Applications must include an Executive Summary which will be shared with the Campus Community. ***(Attach additional sheets for any section needed.)***

Date of Application: January 21, 2011	**Project Type: [X] New**	**[ ] Upgrade/Expansion**
Project Director: Paul Root **Department/Division: Chemistry/Science**	**How many students will *directly* benefit from the project?** **~2300 students / year**	**Total TIF Funds Requested:** **$ 22,119.50**

Problem Statement

Define the problem/idea.
(What do you want to do? Why?)

Goal #1: Keep the chemistry curriculum up to date and competitive

HFCC has a reputation as an institution committed to providing students with a comprehensive, cutting-edge science education while ensuring a personalized educational experience through small class sizes. Modern chemical instrumentation is needed to improve and expand the chemistry laboratory experiments offered at HFCC. Updating and integrating new instrumentation into chemistry courses generates an enormous amount of interest and enthusiasm among students and demonstrates a return on the time, money and effort our students put into their education. Specifically, the purchase of new DigiMelt melting point apparatus would provide students with access to experimental data that is not presently attainable, hands-on experience with technically-advanced instrumentation and continuity with this type of apparatus across all chemistry laboratory courses.

The DigiMelt melting point apparatus would be incorporated into the following chemistry courses:

- CHEM131 (~1650 students/yr)
- CHEM132 (~225 students/yr)

} non-majors level

- CHEM141 (~375 students/yr)
- CHEM151 (~15 students/ys)
- CHEM243 (~35 students/yr)
- CHEM244 (~15 students/yr)

} majors level

In this proposal, we are requesting forty-two DigiMelt melting point apparatus. This would provide three class-sets of instruments allowing for three labs to run simultaneously.

The DigiMelt melting point apparatus would replace several versions of melting point apparatus we currently use which had either been built "in-house", or had been purchased but are no longer manufactured. Having students use the same instrument across all chemistry courses would provide consistency for our students. It would change the emphasis from learning how to use an instrument to focus more on the chemistry behind an experiment. The DigiMelt instruments are faster, more reliable and safer than what we presently use. These are the same instruments used at MSU and MOTT Community College. The DigiMelt melting point apparatus will help keep the chemistry curriculum at HFCC relevant, up-to-date and competitive with regional institutions. They will help position our students for success as they continue on in academics or career pathways.

	Goal #2: Create new opportunities for student research The Digimelt melting point apparatus will create new opportunities for directed studies projects in chemistry which is presently lacking of modern equipment. Many students involved with chemistry related directed study projects either travel off-site to carry out their experiments, or are limited to research papers. The Digimelt melting point apparatus would offer students the opportunity for an experimental based chemistry project on campus. **Goal #3: Enhance the Biotechnology Program** The Biotechnology Program at HFCC provides students with the knowledge, skills, and techniques necessary to work as technicians in laboratories of pharmaceutical and biotechnical corporations and at universities and other institutions. CHEM151 (~15 students/yr) is a core-course in this program and is designed to provide students with experience gathering and interpreting data using various types of lab instrumentation. The Digimelt melting point apparatus would be integrated into this course and used by student to characterize molecules, identify unknown compounds, and evaluate product purity.
Evidence for Project Validity *(What is the current situation?)*	
What resources do you have/use now?	The chemistry department currently uses Meltemp melting point apparatus for its organic courses (CHEM132, CHEM243, and CHEM244). The Meltemp melting point apparatus is no longer manufactured and is not available for purchase. The number of working melting point apparatus has reached the point where we no longer have a class-set of instruments. The introductory chemistry courses (CHEM131 and CHEM141) use several versions of melting point apparatus which had been built "in-house". There are reliability, accuracy and safety issues around the continued use of these instruments. They are certainly below what should be acceptable in a College level chemistry laboratory.
Why can't you use your existing resources to do this project?	The melting point apparatus which have been built "in-house" do not provide the accuracy, reliability and safety needed by our students, or by our faculty. They limit the type and scope of experiments which can be performed. These instruments are the first experience students have with melting points. These are clearly not an example of modern instrumentation, and do not portray a sense of value in the laboratory experience of our students. As students continue on to the organic courses, they must learn how to measure melting points with the Meltemp melting point apparatus. We no longer have enough Meltemp instruments for a complete class. Students need to work in larger groups, thus limiting their hands-on laboratory experience. The Meltemp instruments when used incorrectly have significant risk associated with them. These instruments can reach a maximum temperature of 500°C, greatly exceeding the capacity of the thermometer. The high temperature becomes a risk for burns, and failure of the thermometer. The DigiMelt melting point apparatus are faster, more reliable and safer than any of the instruments we presently use. They do not require specialized training, are easy to use, any can be immediately integrated into all of our chemistry courses.
What evidence do you have that this project will be successful? *(Cite specific information.)* • Current research • Examples from other schools or teachers • Letters of support from experts in the field • Your own past experience.	Stanford Research Systems Inc. (SRS) has been in business since 1980. This company designs and manufactures instruments for research and industrial applications. The DigiMelt melting point apparatus was specifically designed to be a student-grade instrument while maintaining the quality and capabilities of an industrial grade melting point apparatus. The DigiMelt has been available for two years and is already in use at MSU and MOTT Community College. These instruments have the widespread approval of all faculty members in the chemistry department at HFCC. Letters of support can be made available upon request. I have over 15 years of chemistry laboratory experience and have used several different models of melting point apparatus. In thoroughly looking into the DigiMelt melting point apparatus, and competitive models, this is by far the best suited and most cost-effective instrument for melting point analyses.

Relevance to Technology Investment Committee Guidelines *(Address only those that apply.)*	
INNOVATION: **Is the proposal innovative to the field of Instructional Technology?**	This proposal is innovative to the field of Instructional Technology, in that it will provide students with hands-on experience with modern instrumentation in the chemistry laboratory. The DigiMelt melting point apparatus will provide students with the ability to use experimental data to identify an unknown compound, assess product purity and correlate physical properties to the chemical nature of a molecule.
Is the proposal innovative to HFCC?	This proposal will allow the College to acquire new instrumentation that will greatly expand the experimental capabilities of our chemistry students. The DigiMelt melting point apparatus will allow for research based directed-study chemistry projects, and novel chemistry laboratory activities that are not typically found at community colleges.
Is the proposal innovative to the specific discipline?	This proposal is innovative to the chemistry department at HFCC. As a department we are striving to provide our students with an up-to-date, and relevant science education. The use of the DigiMelt melting point apparatus across all chemistry courses will aid in this effort. The continuity will benefit our students. The capability of these instruments will allow for the development of new laboratory exercises and for the enhancement of current experiments The idea of using the same instruments and having continuity across all chemistry courses has initiated dialogue to look into the acquisition and use of certain common instruments across the entire Science Division.
NEED: **Is the proposal essential for the instructional design?**	Our current melting point instruments limit the number and type of experiments we can perform. The DigiMelt melting point apparatus offer a faster, safer and more reliable alternative. These instruments will allow for the enhancement of existing experiments and for the development of novel laboratory activities.
Does it create new programs or courses with the potential for increased student enrollment?	Beyond the current chemistry classes previously described, the DigiMelt melting point apparatus would be used in CHEM220. This is a newly developed quantitative analysis course which has yet to be offered. As a department we have had some preliminary discussions about the possibility of developing a Chemical Technician Program. If such a program were to be developed, these instruments would be used in those newly developed courses.
Is it necessary to remain competitive with post-secondary institutions?	The inclusion of modern instrumentation into chemistry courses is essential if HFCC is to continue offering its students the most relevant, up-to-date, comprehensive education possible. Other post-secondary institutions (MSU, and MOTT Community College) already use DigiMelt instruments.
Does it provide skills that are transferable to the workplace?	Students will get hands-on experience obtaining experimental data using a melting point apparatus. As a technique, it would directly translate to the workplace. More beneficial would be the experience with critical thinking students would gain from using experimental data to determine the identity or an unknown compound, or deduce the structural nature of a molecule.
Does it prepare students for transfer to upper-level curriculum?	Students continuing a chemistry education at a 4-year institution would use this technique. As mentioned above, the greater benefit lies in the experience students gain in critical thinking. These skills would help our students succeed in upper-level disciplines beyond just chemistry.

Relevance to Technology Investment Committee Guidelines (continued) *(Address only those that apply.)*	
Does it keep the course or program current in the related technology?	The DigiMelt melting point apparatus would help keep instrumentation used in the chemistry department modern and up-to-date. The effectiveness of our programs in preparing students for advanced training and future careers is partly dependent on the availability and relevance of the technologies integrated into them.
NATURE OF PROPOSAL: **Is the proposal a component of curricular revision?**	Yes, existing laboratory experiments will be modified or enhanced in the chemistry courses; CHEM131, CHEM132, CHEM141, CHEM151, CHEM243, and CHEM244. The DigiMelt melting point apparatus would also allow for the creation of new lab activities in each of these courses.
Is it the next logical step in the evolution of the course/curriculum?	Yes, the DigiMelt melting point apparatus represent the next logical step in updating the curriculum in the chemistry department. If offers continuity with instrumentation to our students as they progress through our courses. These instruments will increase the safety and success of experiments in our chemistry laboratories.
Will it help attract students to HFCC?	Laboratory experiments are often the most exciting and memorable component of science class for many students. Having laboratories equipped with modern instrumentation helps generate a great deal of enthusiasm and interest for both students and faculty. Investing in our laboratory equipment demonstrates to our students that we value their educational experience. Integrating the DigiMelt melting point apparatus into current courses can certainly help further the reputation of HFCC as an institution where students have access to both individualized attention in small classes and up-to-date, relevant technologies.
Will it support HFCC community outreach/public relations activities?	The DigiMelt melting point apparatus can support HFCC's reputation as an affordable source for rigorous and relevant science education by improving the quality of hands-on experiences students have in the chemistry laboratory. These instruments could be showcased during annual open house activities, or featured in brochures and posters for the Science Division.
Will it support student retention activities at HFCC?	The DigiMelt instruments can support student retention at HFCC by making existing chemistry courses more technologically relevant. There is the potential for expanding our course offerings (CHEM220) or developing new programs such as a Chemical Technician Program. In addition, the DigiMelt melting point apparatus would provide Honors students with instrumentation that could be used in experiment based directed studies chemistry projects.
Will it become an integral part of the course, program or curriculum?	Yes, the DigiMelt melting point apparatus would be integrated into all chemistry courses which contain laboratory actuvities involving the measurement of melting points (CHEM131, CHEM132, CHEM141, CHEM151, CHEM243, and CHEM244).

Resources		
Where will the project hardware be installed?	The DigiMelt melting point apparatus is a portable bench-top instrument. One set of instruments would be located in the basement of the Health Careers Building (H-004) and two sets of instruments would be located in the Science Building (S-30). These instruments would be stored securely in laboratory prep-rooms when not in use.	
Who will do the job? • **List the personnel** • **List their duties**	The DigiMelt melting point apparatus does not require installation.	
Who will use the hardware?	Students enrolled in chemistry courses (CHEM131, CHEM132, CHEM141, CHEM151, CHEM243, and CHEM244) will be the primary users of this hardware. Full-time and adjunct instructors in these courses will facilitate student use of these instruments by modeling appropriate techniques prior to the beginning of the experiment.	
Who will conduct any necessary project-hardware training?	Paul Root will provide training to faculty with the proper use of the DigiMelt melting point apparatus. Dr. Serhiy Pasishnyk, the Chemistry Lab Manager, will ensure adjunct faculty are properly trained with use of this instrument.	
Who will handle any spring and summer semester duties related to hardware installation?	Any issue(s) arising during spring or summer semesters will be handled by Dr. Serhiy Pasishnyk.	
Do you have commitment from your administration for personnel support? *(Be specific, include documentation.)*	Personnel support beyond routine faculty responsibilities is not required for this project	
Is release time required to complete this project? **If yes, has it been approved at this time by your Associate Dean?**	**[ ] Yes [X] No** **[ ] Yes [ ] No**	*TIF does not fund release time. If you are requesting release time, it must be approved by the appropriate administrators prior to proposal submission.*

Evaluation

(How will you know if it worked?)

How will you demonstrate to the college that this was an effective use of funds? *(How will you evaluate the goals listed as Expected Outcomes?)*	The effectiveness of activities using the DigiMelt melting point apparatus will be measured by evaluating students' ability to: - Use modern chemical laboratory instrumentation - Demonstrate proficiency in chemical laboratory techniques - Demonstrate a conceptual understanding of factors influencing a melting point - Demonstrate critical thinking skills through data analysis and identification of unknowns - Design spectroscopy-based experiments (re: Honors students)
How will you determine the success or shortcomings of the project?	The outcomes of this project will be evaluated by the successful development of new laboratory activities (or improvement of existing activities) related to melting point analysis in the targeted courses. Success will be defined as activities that result in greater student understanding of chemical principles and in broader student experience with modern chemical instrumentation.

Budget
(You must also include an itemized budget statement.)

What do you need to complete this project? *(Be specific about equipment, software, and training.)*	This project requires the following: - fourty-two DigiMelt melting point apparatus (3 class-sets of 16 instruments) Specialized training and software are not required for this proposal.
What is the TOTAL COST? *(You must attach an itemized cost analysis with this proposal.)*	DigiMelt melting point apparatus (quantity = 42) $ 33,180.00 Shipping *(estimated by SRS)* $ 630.00 5% discount from SRS $ - 1,690.50 contribution from Science Division $ - 10,000.00 **total TIF funds requested** **$ 22,119.50**
How recent is your quote?	January 21, 2011
Are changes to the college infrastructure necessary to support this project?	**[ ] Yes [X] No** *If "yes" provide an explanation from the Directors of Data & Voice and Buildings & Grounds, and from the Administrator in charge of the affected room(s).*
What other monetary commitments exist? *(Department/Division/ External) Please be specific; include documentation wherever possible.*	The Science Division has agreed to contribute $10,000 from its Divisional Funds to support this proposal. The Science Division will also pay for the ongoing cost of capillary tubes needed to use these instruments.
If other sources of funding are not available, why? • **Doesn't have the support?** • **Not viewed as feasible?** • **Not a priority?** • **Other?**	Not applicable.

Strategic Plan

Include with your application a document that indicates the ways in which your project addresses the goals and objectives of the Henry Ford Community College Strategic Plan. Also, indicate how your project addresses your Division or Department plan. Be as specific as possible.

This proposal supports Strategic Plan at the College level in the following manner:

Goal 2, Objective A: *Develop new and revise existing programs and curricula to meet the expectations of students, transfer institutions, and the workforce.*

- The proposal will be used to develop new experiments and enhance existing chemistry laboratory activities.
- The DigiMelt melting point apparatus will provide students hands-on experience with a modern laboratory instrument to perform an analytical technique widely used in related industries as well as four-year institutions.

Goal 3, Objective A: *Ensure that HFCC students are prepared with the knowledge and skills required to successfully live and work in a rapidly-changing, global economy and society.*

- The DigiMelt melting point apparatus will allow student to collect experimental data using a technically advanced instrument.
- Students will strengthen critical thinking skills through interpretation of their experimental data.

Goal 4, Objective F: *Ensure that the use of all College funds is efficient and effective and is in accordance with the mission and goals of the College.*

- These instruments are the most cost-effecting melting-point apparatus. Competitive instruments are more money and many require an external thermometer.
- The DigiMelt melting point apparatus has an integrated digital thermometer eliminating the risk of breakage, continued replacement and cost of separate thermometers.
- This instrument does not use a mercury thermometer eliminating the chance of costly abatement in case of a spill.

Goal 7: Objective B: *Create and improve partnerships with private and public entities to establish HFCC as a premier educational resource for economic development.*

- These instruments will be an integrated into CHEM151 as a component of the Biotechnology Program.
- Integrating the DigiMelt melting point apparatus into the chemistry curriculum will position HFCC as a premier institution for the education and training of highly trained workers needed by the expanding biotechnology industries and related fields in our region.

Instructional Proposals

Complete this section if this is an Instructional Proposal, directly impacting student teaching and learning.

Expected Outcomes *(Project Objectives)*	
What is your current teaching method? How will this project fit into your current plan?	Current teaching methods for chemical analysis include lectures, demonstrations, and laboratory experiments. The incorporation of the DigiMelt melting point apparatus into the science curriculum, particularly into current and new chemistry courses, will provide students with greater opportunities for understanding chemical principles and techniques, while gaining hands-on experience with modern, relevant laboratory instrumentation.
How will this improve student learning? *(List specific goals.)*	*As a result of this project students will:* - Develop a deeper conceptual understanding of melting point determination as a critical modern experimental tool - Gain hands-on experience with a broader range of laboratory activities involving melting point measurements - Gain hands-on experience with modern chemical laboratory instrumentation - Develop critical thinking skills through data analysis and identification of unknowns - Have access to a broader range of research projects (honors students directed study projects)

Instructional Proposals (continued)

State how the project addresses the Seven Principles of Good Practice in Undergraduate Education. *(Address only the relevant criteria.)*	
Supports student-faculty contact	Students will have greater opportunities for honors directed studies projects, allowing for more student-faculty contact.
Supports cooperation among students	Students will work cooperatively as lab-partners when using the DigiMelt melting point apparatus in the laboratory. These partners will collaborate to prepare and analyze samples, interpret data, and report their findings.
Supports active learning	Students will gain hands-on experience with techniques that they learn conceptually in class. The DigiMelt instruments are user-friendly, modern, and reliable, and will allow for a safe guided-inquiry style laboratory activity.
Supports prompt feedback	Students will acquire data safer, faster and more accurately using these instruments compared to what is currently used. Students will be able to start and finish a melting point analysis in approximately ten minutes.
Supports time on task	The DigiMelt melting point apparatus is designed as a user-friendly as a student-grade instrument. Students spend less time learning how to use the instrument and more time focused on the chemistry associated with their activity.
Supports high expectations	HFCC's Science Division provides a comprehensive, first-rate education to students preparing for advanced science programs within the college and at other institutions. The acquisition of modern laboratory instrumentation such as the DigiMelt melting point apparatus demonstrates a commitment on the part of HFCC to support the high expectations held of our students.
Supports diverse talents and ways of learning	Hands-on experience with the DigiMelt melting point apparatus will complement topics addressed in lectures, readings, and discussions. The use of laboratory activities to reinforce seemingly abstract theories and concept supports diverse talents and ways of learning.

SIGNATURES:

Paul Root Jan 21/11
**Project Director Date

21 JAN 11
*Associate Dean/Department Head Date

*Vice President Date

1/21/11
**Director of Building & Grounds Date

1-21-2011
**Director of Data & Voice Date

* For notification purposes only
* * For project feasibility

Henry Ford Community College

Technology Investment Fund
Project Funding Request

Executive Summary

DATE OF APPLICATION	PROJECT TYPE
January 21, 2011	X New Upgrade/Expansion
NAME OF PROJECT DIRECTOR OR PRESENTER	**DEPARTMENT/DIVISION**
Paul Root	Chemistry Department / Science Division
COST OF PROPOSED PROJECT	**NUMBER OF STUDENTS SERVED ANNUALLY**
$ 22,119.50	~2300 students/yr

SUMMARY

Henry Ford Community College has a reputation as an institution committed to providing students with a comprehensive, cutting-edge science education while ensuring a personalized educational experience through small class sizes. Modern chemical instrumentation is needed to improve and expand the chemistry laboratory experiments offered at HFCC. Updating and integrating new instrumentation into the chemistry courses generates an enormous amount of interest and enthusiasm among students and demonstrates a return on the time, money and effort our students put into their education. Specifically, the purchase of new DigiMelt melting point apparatus would provide students with access to experimental data that is not presently attainable, hands-on experience with technically-advanced instrumentation and continuity with this type of apparatus across all chemistry laboratory courses at HFCC.

Melting point analysis is an analytical technique that can be used to help characterize molecules, identify an unknown compound, and evaluate the purity of a product. In this proposal, we are requesting forty-two DigiMelt melting point apparatus. This would provide three class-sets of instruments and would replace several antiquated versions of melting point apparatus we currently use. The DigiMelt melting point apparatus are faster, more reliable and safer than any of the instruments we presently use. These instruments will allow for the enhancement of existing experiments and for the development of novel laboratory activities. Having students use the same instrument across all chemistry courses would provide consistency for our students. It would change the emphasis from learning how to use an instrument to focus more on the chemistry behind an experiment. The DigiMelt melting point apparatus will help keep the chemistry curriculum at HFCC relevant, up-to-date and competitive with regional institutions. They will help position our students for success as they continue on in academics or career pathways.

(Attach additional sheets if needed.)