Initiative Briefing

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The American University in Cairo

The SSE Mathematica Initiative Launch Event

"...what you’ll learn in 15 minutes can save hours and days of effort..."

WEDNESDAY, 6 NOVEMBER

14:00 Welcoming Remarks–Dean Tarek Shawki
14:05 Remarks–President Anderson
14:10 Remarks–Provost Amr Shaarawi
14:15 Prerecorded Presentation–Conrad Wolfram
14:35 Presentation–Phillip Cotterill
15:05 Presentation–Dean Tarek Shawki
15:30 Q&A–Conrad Wolfram
16:00 Final Remarks and Wrap-Up

To find out more, please contact Phillip Cotterill at philip_cotterill@wolfram.com
About Wolfram Research

Founded by Stephen Wolfram in 1987, Wolfram Research is one of the world's most respected software companies—as well as a powerhouse of scientific and technical innovation.

As pioneers in computational science and the computational paradigm, they have pursued a long-term vision to develop the science, technology, and tools to make computation an ever-more-potent force in today's and tomorrow's world.

At the center is Mathematica: their ever-advancing core product that launched modern technical computing and has now become the world's most powerful global computation system. With millions of dedicated users throughout the technical and educational communities, Mathematica represents a unique blend of major research breakthroughs, outstanding user-oriented design, and world-class software engineering.

What Is Mathematica?

Almost any workflow involves computing results, and that's what Mathematica does—from building a hedge-fund trading website or publishing interactive engineering textbooks, to developing embedded image-recognition algorithms or teaching calculus.

Mathematica is renowned as the world's ultimate application for computations. But it's much more—it's the only development platform fully integrating computation into complete workflows, moving you seamlessly from initial ideas all the way to deployed individual or enterprise solutions.

Watch a Quick Overview of Mathematica»

Uses for Education

Mathematica offers a complete environment to create materials for your courses, seamlessly combining a powerful calculation and dynamic visualization engine with a professional-quality documentation and presentation tool. Now there's no need to jump between different programs to get your work done.
Did you know that Mathematica’s customizable documents provide an interactive, textbook-like combination of graphics, computations, and dynamic models?

**Turn concepts into lesson plans**

Whether you are designing or revising a course, *Mathematica* will help you organize and test your ideas and quickly develop them into an actual lesson plan.

Did you know that the Wolfram Demonstrations Project contains thousands of interactive models that can be used in lectures or projects?

**Utilize pre-existing materials in course development**

*Mathematica* will save you time by allowing you to utilize existing course materials and examples developed by other educators and refine them for your needs.

Did you know that Mathematica’s slide show mode allows you to rotate graphics and manipulate interactive models, unlike static presentation formats?

**Design and present lecture materials**

*Mathematica* lets you turn all of the materials you have created for your lecture—notes, equations, examples, illustrations, and demonstrations—into a dynamic presentation that you can modify on the fly.
Did you know that, unlike systems like MathType, which are only good for displaying notation, Mathematica lets you use typeset mathematics in your computations?

Generate professional looking documents

No matter if you need to create syllabi, lesson plans, student assignments, or exams, Mathematica gives you the freedom to include technical elements in your documents without compromising on aesthetics.

Did you know that you can create an interactive model in less than 60 seconds with one simple command?

Generate interactive student lab activities/projects

Creating interactive models in Mathematica allows students to explore hard-to-understand concepts, test theories, and quickly gain a deeper understanding of the materials being taught firsthand.
Uses for Research

*Mathematica’s* state-of-the-art algorithms, powerful computational abilities for modeling and simulation, self-checking high-precision arithmetic, and high-performance computing capabilities to handle large datasets, plus the world’s most accurate symbolic and numeric engine, make it the ideal software for academic research.

Did you know that images can be dragged and dropped directly into Mathematica for further processing?

**Import your data in a single, easy step**

*Mathematica* lets you import a variety of data formats—numerical, textual, geometric, graphical, XML, even sound data—with the ability to extract individual elements of the data file for analysis.
Did you know that the Parallelize command will automatically parallelize a computation for you, where possible?

Analyze your data with accurate and reliable results

With Mathematica, you'll get highly accurate and reliable results quickly, helping you maintain strict timelines, no matter the type of data you need to analyze—numeric, symbolic, textual, image, sound, or signal.

Did you know that Mathematica automatically optimizes the balance between computational efficiency and visual sophistication?

Visualize your data and the results of your analyses

Even if you are working with sparse or complex datasets, Mathematica will help you visualize your data and the results of your analyses.
Did you know that Mathematica's built-in parallel computing capabilities are ideal for running Monte Carlo simulations?

Create simulations to test hypotheses

The ability to simulate complex systems with Mathematica can assist you in making and testing conjectures about data, identifying new and unexpected relationships, and gaining a deeper understanding of the methodology behind the algorithms used in analyzing the data.

Did you know that you can save your work to hundreds of different formats, including LaTeX, PDF, and HTML?

Report and document your results

Whether you're documenting the results of your research for colleagues, submitting an article to a journal, authoring a book, or writing a report for an administrator, Mathematica will help you provide your results in a user-friendly format that clearly documents your findings.
Why *Mathematica* for SSE?

The integration of modern, state-of-the-art, technology in SSE’s education is an integral element of the school’s five-year strategic plan. *In fact, we seek to dramatically improve and upgrade the quality of our education by systematically revising learning outcomes, revising pedagogy, optimally integrating technology in such a way so as to ensure that our graduates are equipped with the appropriate 21st century skills.*

Hence, *Mathematica* along with a host of Wolfram technologies represent a perfect fitting for our areas of science and engineering education/research. There is in fact a host of technologies produced by Wolfram Research where *Mathematica* is at the heart of it but we are equally interested in their companion products like “System Modeler”, “Workbench”, “Wolfram Alpha”, and “Web Mathematica”. Such tools can transform the way we teach, the way by which students receive and understand information and revolutionize our computational research work.

The integration of such powerful technical computing tools will surely force faculty to re-think pedagogy, course curricula and assessment; thus leading to modernizing our entire range of course offerings. Furthermore, full access to such technologies by all students will impact their learning in significant ways.

What is the Cooperation About?

The MOU with Wolfram Research entails:

- **Site License Agreement** for SSE giving access to *Mathematica* and all companion products for all students, staff and faculty for AY 2013-14.
- On-Site Extensive **Wolfram Training** for 25 “Champion Faculty” who will then serve as the master trainers for the rest of the faculty. [Training is for 10 full working days leading to a globally recognized certification]
- **On-Site Peer Mentoring** by Wolfram Experts to SSE selected faculty in order to transform, at least, 10 courses during AY 2013-14.

Therefore, we plane to institute a cascading training plan for all SSE faculty throughout the year combined with the work to develop “*Mathematica*-based” SSE courses”, “*Mathematica* Lab Simulations” and we will announce two competitions for both faculty and staff with financial rewards.

We will work on monitoring and assessing this pilot phase aiming at producing a formal evaluation during the summer of 2014.
Next Action Items for SSE

The execution of this initiative requires full cooperation among all SSE faculty, students and administrators. It is our collective enthusiasm and interest that will lead to the success of this initiative. This is not a cooperation involving an acquisition of a software site license but rather a comprehensive program to transform our courses in such a way as to benefit from the vast technical powers of the software leading to students with the appropriate 21st century skills in our fields of interest.

The Action Items may be itemized as follows:

1. **Sign** the Cooperation legal documents: (a) the *Mathematica* License Agreement and (b) the Memorandum of Understanding.
2. We will, shortly after, receive the software and its related management tools to **distribute** across the school through a selected “Site Administrator”.
3. The School Council must decide the **appropriate timeframe** to invite the Wolfram Research (WR) expert trainers to Cairo in order to conduct the extensive 2-weeks *Mathematica* training.
4. The School Council must also finalize the **selection of 25 Champion faculty** to receive the Wolfram professional training. **Two or three candidates** must be selected by each department with an eye on the fact that the selected candidates will be considered as “Master *Mathematica* Trainers” for SSE and they must agree to train their colleagues during the weeks and months to follow.
5. The School Council must finalize the **Selection of 10 Pilot Courses** to be transformed Pedagogically during the Spring Semester of 2014 into Computer-based, *Mathematica* powered courses with the direct help of resident WR experts.
6. The Dean will Choose a “**Monitoring & Evaluation**” team of faculty to record the pilot year and produce a final assessment report by the end of the Spring Semester of 2014.
7. The Dean will launch, in consultation with the School Council, **two competitions**: (a) **Faculty Awards** for the best transformed courses and (b) **Student Awards** for the best *Mathematica* Interactive Simulations. A financial award is envisioned for the winners plus a certificate of recognition.
8. **An end of year workshop**, to be media covered, in order to **share the experiences** of the first pilot year, **review the assessment report**, generate **recommendations** for the second phase of the initiative and **deliver the awards** of the two competitions.