

Science for all – Engaging children and young people in math, science and technology education

Prof. Maija Aksela
Director, LUMA Centre Finland

LUMA = STEM

LU stands for natural sciences ('LUonnontieteet' in Finnish), and MA for mathematics



Sunny greetings from Finland - "Pisa country"!

Finnish Education in a Nutshell

Background for Finnish PISA Success

Finland - a country of thousand lakes and islands

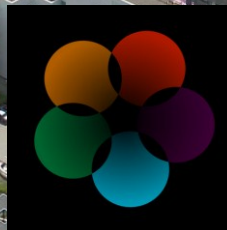


See more: [This is Finland.fi](https://thisisfinland.fi)



UNIVERSITY OF HELSINKI

FACULTY OF SCIENCE



**The main office of
LUMA Centre**

<http://www.helsinki.fi/university>



Why new ways?



**Low interest
in math, science
and technology
among students**



**Concern over
the level of
general scientific
knowledge and
the shortage of
STEM experts**



**Need to inspire
and motivate
children & youth,
and to support
and train
teachers**



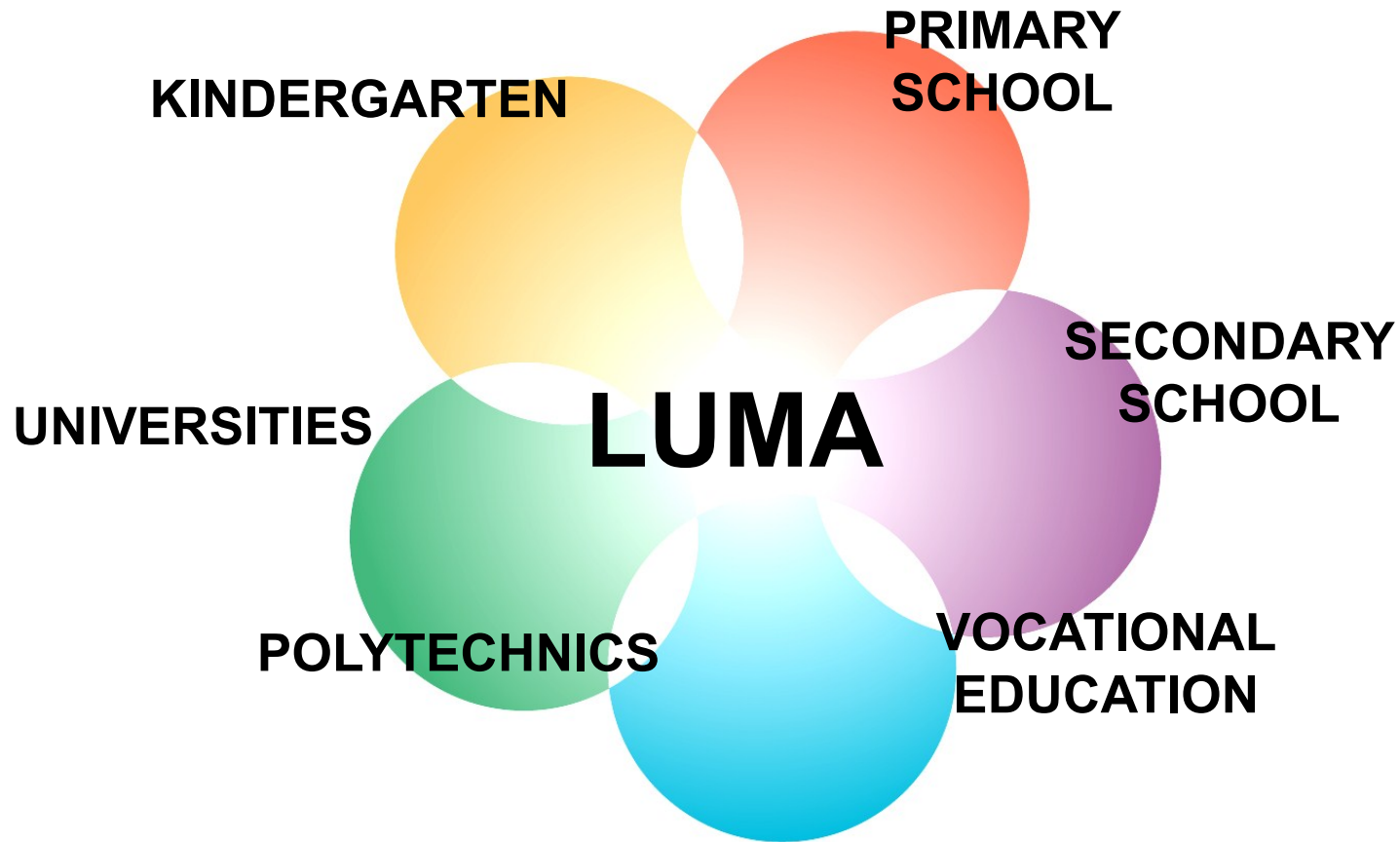
LUMA Centre Finland

- Central Finland LUMA Centre (**University of Jyväskylä**)
- LUMA Centre Aalto (**Aalto University**)
- LUMA Centre of Central Ostrobothnia (**Kokkola University Consortium Chydenius**)
- LUMA Centre of Southwestern Finland (**University of Turku**)
- LUMA Centre of the University of Eastern Finland (**University of Eastern Finland**)
- LUMA Centre of the University of Helsinki (**University of Helsinki**)
- LUMA Centre Päijät-Häme (**Lahti University Campus**)
- LUMA Centre Saimaa (**Lappeenranta University of Technology**)
- OuLUMA Centre (**University of Oulu**)
- Tampere LUMATE Centre (**University of Tampere & Tampere University of Technology**)



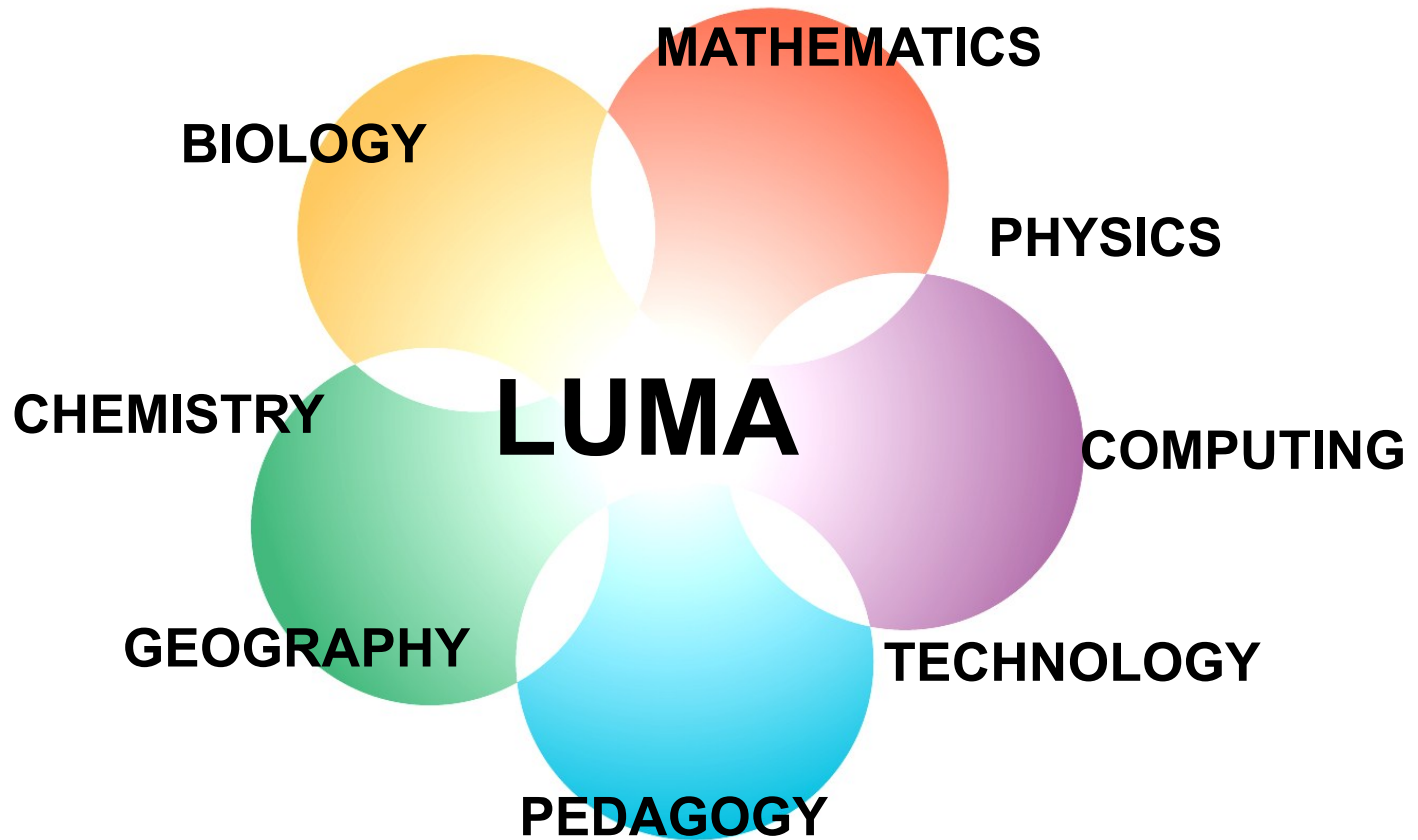


All educational levels



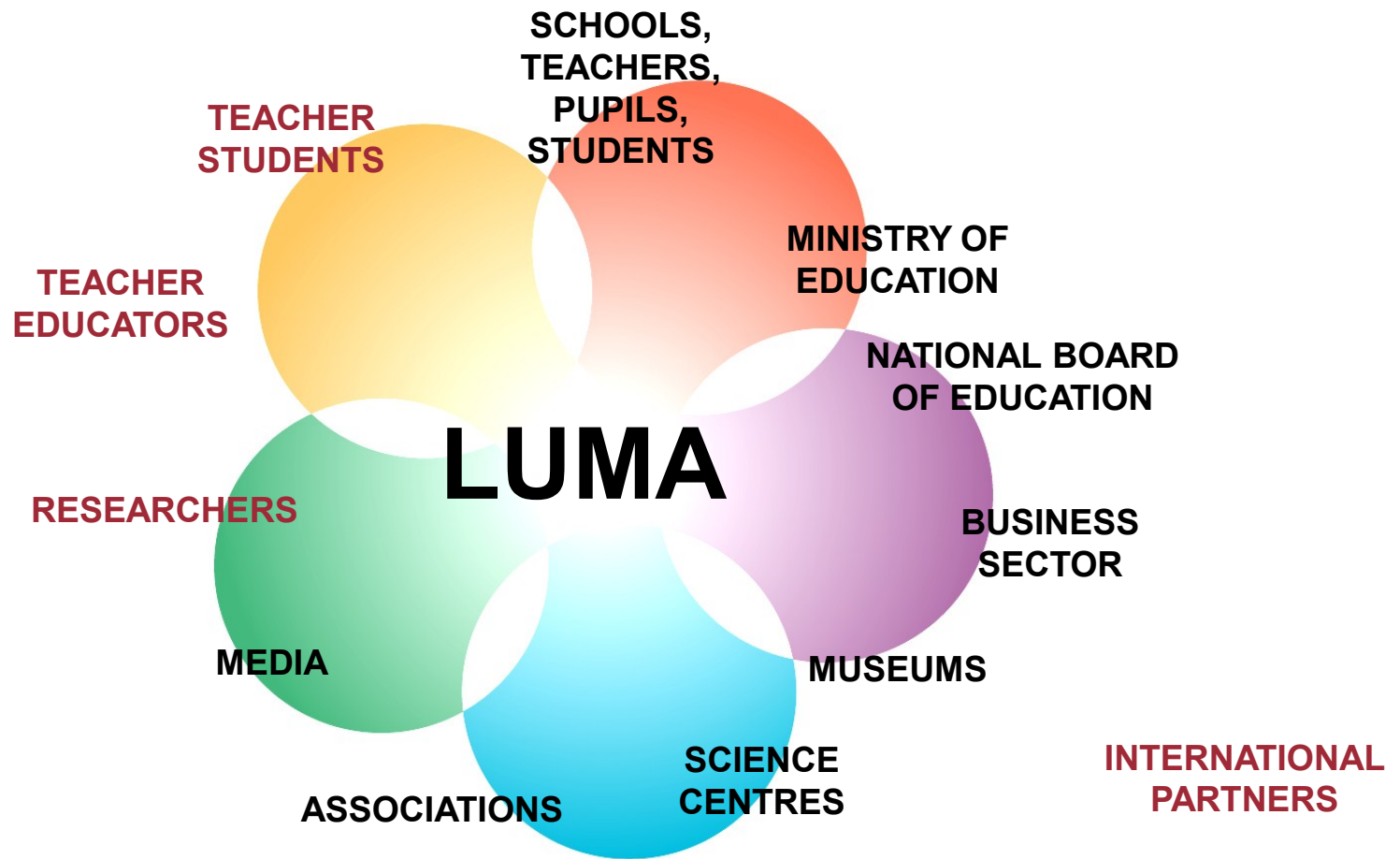


All relevant fields of science



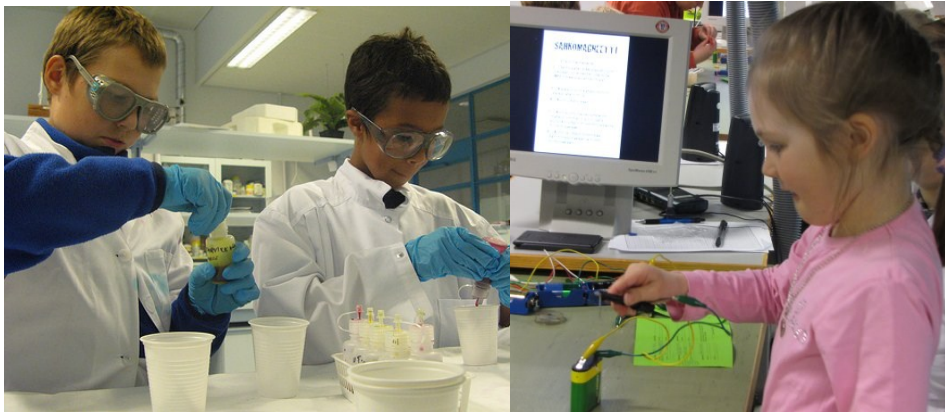


All relevant partners





Hands-on, minds-on activities for children and youth





Clubs, camps, events



Little Jippo clubs for children aged 3–6



Clubs, camps, events





Clubs, camps, events





MILLENNIUM YOUTH CAMP

- International camp (attendees from over 30 countries)
- Project started in 2009
- Has been held 4 times so far (2010-2013)
- Video: <http://vimeo.com/44297975>





MILLENNIUM YOUTH CAMP: Application

- 1000-1600 applications
- Over 100 countries
- 100 selected to round 2 of application
- 30 youth selected to camp
 - Gifted
 - Motivated
 - International (22 countries were represented in 2012)

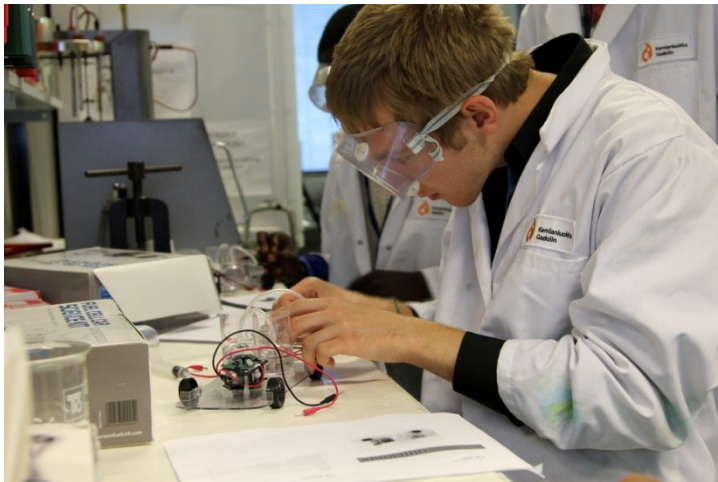




MILLENNIUM YOUTH CAMP:

Aim

- Encourage gifted students (16-19 years old)
- Help youth find like-minded people
- Open doors to educational opportunities
- Give an opportunity to meet and interact with top-class scientists





MILLENNIUM YOUTH CAMP: Camp Week

- 7–8 days
- Free of charge!
- Work on a group project
- Visits to companies and universities
- Meeting experts and Millennium Technology Prize winners
- Fun!
 - International evening
 - Amazing Race of Science
 - Sauna





MILLENNIUM YOUTH CAMP: Project Work

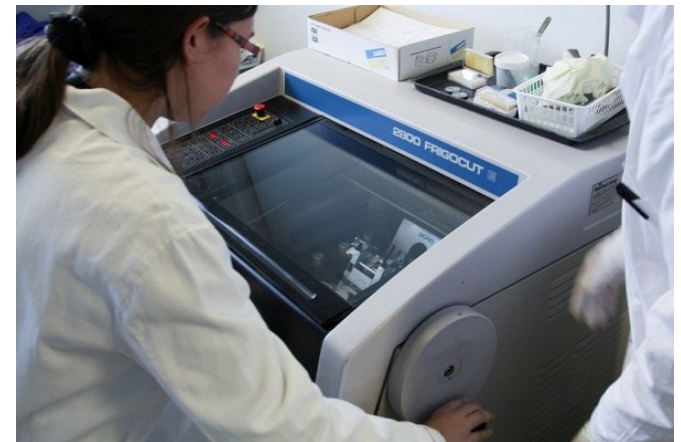
- Campers work in theme groups
- Experts guide them during the process
- Works are presented at the Millennium Youth Camp Gala





MILLENNIUM YOUTH CAMP: Theme Groups

1. Applied Mathematics,
2. Bioscience and Biotechnology,
3. Climate and Climate Change
4. Energy
5. Food Sciences and Food Technology,
6. ICT and Digitalization
7. Material Sciences and Material Technology,
8. Renewable Natural Resources
9. Urban Planning
10. Water





MYC: Research



- What do youth find important in non-formal learning?
- What are the long-term effects of non-formal learning?
- What is the nature of scientific, societal and moral questions that gifted youth ask?
- How do gifted youth think about climate change? (unpublished)
- What do youth find important in non-formal learning?
- What are the long-term effects of non-formal learning?



National webmagazine for children and their parents

Jippo - Lasten luonnontiedeverkkolehti

Jippo



Etusivu

Tutkimustupa

Jipon pähkinät

Kysy Jipolta

Jippolan Sanomat

Tiesitkö?

Pikku-Jipot

Lemmikkikorneri

Meidän luokka

Tutki ja ihmettele: Sokerisateenkaari

Tutkimustupa

Pistä sateenkaari lasiin!



Tarvitset:

- läpinäkyvän, ohuen lasin
- neljä läpinäkyvää lasia
- mitta-astian
- elintarvikvärejä (esim. ketlainen, sininen, punainen)
- sokeria



National webmagazine for youth



KYSY TUTKIJALTA

OPISKELIJAEIÄMÄÄ

Opiskelijablogit
Opiskelijahaastattelut
Vinkkejä ja linkkejä

TIEDEJUTUT JA UUTISET

Globaalit haasteet
Ihmeellinen elämä
Laboratoriossa tutkittua
Maan uumenista
avaruuteen
Mahtava matematiikka
Teknologian
mahdollisuudet

AKTIVITEETIT

Kokeile kotona
Luova pulma
Tiedekilpailut
Tiedetapahtumat

Kemia voisi olla aika siisti homma!

Opiskelijaelämää / Opiskelijahaastattelut - 16.01.2013

Neljännän vuoden kemian opiskelija Teemu Myllymäki halusi alun perin opiskella lääketiedettä, mutta kiehtova kemia ja sen monet mahdollisuudet veivät nuoren miehen mukanaan jo ensimmäisenä opiskeluvuonna Kumpulan tiedekampuksella.



Teemu Myllymäki. Kuva: Sakari Tolppanen.

Alun perin Lahdesta kotoisin oleva matemaattis-luonnontieteellisen tiedekunnan opiskelija **Teemu Myllymäki**,

LUOVAN TWITTER

Opiskelijat suunnittelivat SpaceApps-kilpailussa Marsiin kasvihuoneen, jotta edes perillä saisi tuoretta purtavaa.
<http://t.co/Oz9E0prXT>

Lukiolainen! Luovan nimikkoleirillä 5.-9.8. luvassa tutkimuksia oikeissa yliopistolaboratorioissa. Ilmoittaudu nyt!
<http://t.co/4Dk1yc6ToO>



Osataan Helsingin yliopistossakin Harlem Shake: <https://t.co/UbG5T0ryV4>

LUOVAN GALLUP

Kuinka pääasiassa suojaat itsesi auringon UV-säteilyltä?



International webmagazine for youth



FRONTPAGE

THEMES

Digital Communication
Earth, Water & Energy
Math & Science

MY CAMP

Blogs
News
Profiles

EVENTS

EUCYS
ScienceSLAM

ACTIVITIES


Try This at Home

About MyScience

MILLENNIUM YOUTH CAMP / NEWS - JUN 11, 2013

Research reality meets Millennium Youth Campers

On Tuesday, Millennium Youth Campers explored research in industrial and academic environments and got their hands on some real life experiments.



The itinerary of the day was filled with exciting visits to companies and institutes where current research is done and new technologies are developed.

ON TWITTER

"Be curious! The world is full of wonders...Connect! It's more fun to work together." MY Camp blog by Ilkka Pollari: <http://t.co/ZO8s61b9WY>

MYC blog by Dr. Wartiovaara: "The Camp sounds exactly what I would have liked to have years ago." <http://t.co/Zo0egUhRaE>

Maths and doing research is fun!" Millennium Youth Camp blog by Camilla Hollanti from Aalto University: <http://t.co/K1IugDLuO4>



Peer-reviewed journal for researchers aged 14–21

**European Journal
for Young Scientists and Engineers**

Current issue of EJYSE

Special Issue for the contestants of European Union Contest For Young Scientists 2011

Published online November 2012

Comparison of three Finnish berries as sensitizers in a dye-sensitized solar cell
by Jarkko Etula

n Cam: The development of a camming device for climbing
by Pius Theiler

Antileaks: A device for detection and discontinuation of leakages in domestic water supply systems
by Gal Oren and Nerya Stroh

**HELSINKI
EUCYS 2011**

Finland's Science Education Centre LUMA, Faculty of Science, University of Helsinki
ISSN 1799-9634 (print) & 1799-9642 (online)



Teacher training and services for teachers





In-service training courses and events





National webmagazine



LUMA Sanomat

Luonnontieteiden, matematiikan, tietotekniikan ja teknologian opetuksen kansallinen verkkolehti



Toukokuun avaus:
Kuinka opettaa paremmin?



Kuukauden kohokohtia



Nuoret ympäri maailman
uskovat
luonnontieteiden ja
teknologian
mahdollisuuksiin



Uutta: LUMA-rahasto
palkitsee vuoden
LUMA-toimijoita

Etusivu »

Hae juttuja, tapahtumia, ...

Hakusanattähän

Jutut »

Tapahtumakalenteri »

Opettajien täydennyskoulutukset »

Lasten ja nuorten kerhot, klubit, leirit ym. »

Materiaalit »

Videot »



Iloa LUMasta kesälläkin

Julkaistu 20.06.2013

Vaikka lukuvuoden koulutyö oli jo päättynyt, **ISSE-symposiumin** illallisella 11.6. iloittiin LUMA:sta, kun vuorossa oli vuoden 2012 LUMA-koulujen ja LinssiLUMA-kilpailun voittajan palkinta.



Luonnontieteistä kisattiin Linnakallion kauniissa maalaismiljöössä

Julkaistu 19.06.2013

Alavieskassa Linnakallion maastossa peruskoulun viides- ja kuudesluokkalaisten kävivät jännittävän matemaattis-luonnontieteellisen MALU-kisan loppukilpailun toukokuussa. Esikarsinnat järjestettiin maaliskuussa.

Ilmoittautuminen käynnissä

- 29.7.-9.8.2013 Toiminnallinen kesäkurssi lukioikäisille matematiikan perusteista ja sovelluksista, Tampere
- 20.9.2013 alkaen Eriyttäminen LUMA-aineiden opetuksessa -täydennyskoulutus, Helsinki

Nyt ajankohtaista

- 30.9. mennessä käsikirjoitukset LUMAT-lehden joulukuun numeroon


Tweets

 **LUMA Sanomat** 19 Jun
@LUMAsanomat

Mukavaa kesää ja Juhannusta!



Journal for publishing research findings & best practices

SUOMEKSI | PÄ SVENSKA

LUMAT


LUMAT


Information on the journal

Issues

Manuscript for publication

Contact information

Twiitit  Seuraa

 19. kesäkuuta

LUMAT
@LUMATnow

Call for papers: NFSUN 2014, Helsinki, Finland, 4th - 6th June 2014
helsinki.fi/luma/nfsun201

LUMAT: Research and Practice in Math, Science and Technology Education

The journal provides Finnish and international researchers and developers of math, science and technology education, and teachers from early education to universities with the possibility to publish their research and good practices. Research articles are peer-reviewed.

Languages of publication are Finnish, Swedish, and English. The abstracts of all articles will be published in all three languages.

The minimum of two issues will be published annually, including special issues dedicated to predetermined themes. The journal is available online free of charge. Printed issues can be later subscribed from Unigrafia's print-on-demand service.


Articles are published under Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND 3.0) copyright license.

Publication schedule

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LUMA News: STEM Education News from Finland




LUMA news

STEM education news from Finland

[Home »](#)
[Contact the editors »](#)
[Subscribe to our newsletter »](#)

Highlights

[A brief introduction to LUMA »](#)
[Get to know the building blocks of Finnish education »](#)




Get to know the building blocks of Finnish education

Published 02.09.2013

The National Board of Education spreads the word on Finnish education. New brochures summarizing the structure and characteristics of the Finnish school system are available now in English.

[Read more](#)



Spreading the joy of science: focus areas of the LUMA network

Published 02.09.2013

LUMA's key to success is our passion for STEM education and openness to new ideas, suggestions and the value of collaboration. In addition LUMA is guided by four focus areas are outlined in the official strategy of the LUMA network.

[Read more](#)

[LUMAT journal for researchers and teachers »](#)
[International Symposium on Science Education \(ISSE\) »](#)

- ISSE 2014
- ISSE 2013
- ISSE 2012
- ISSE 2011

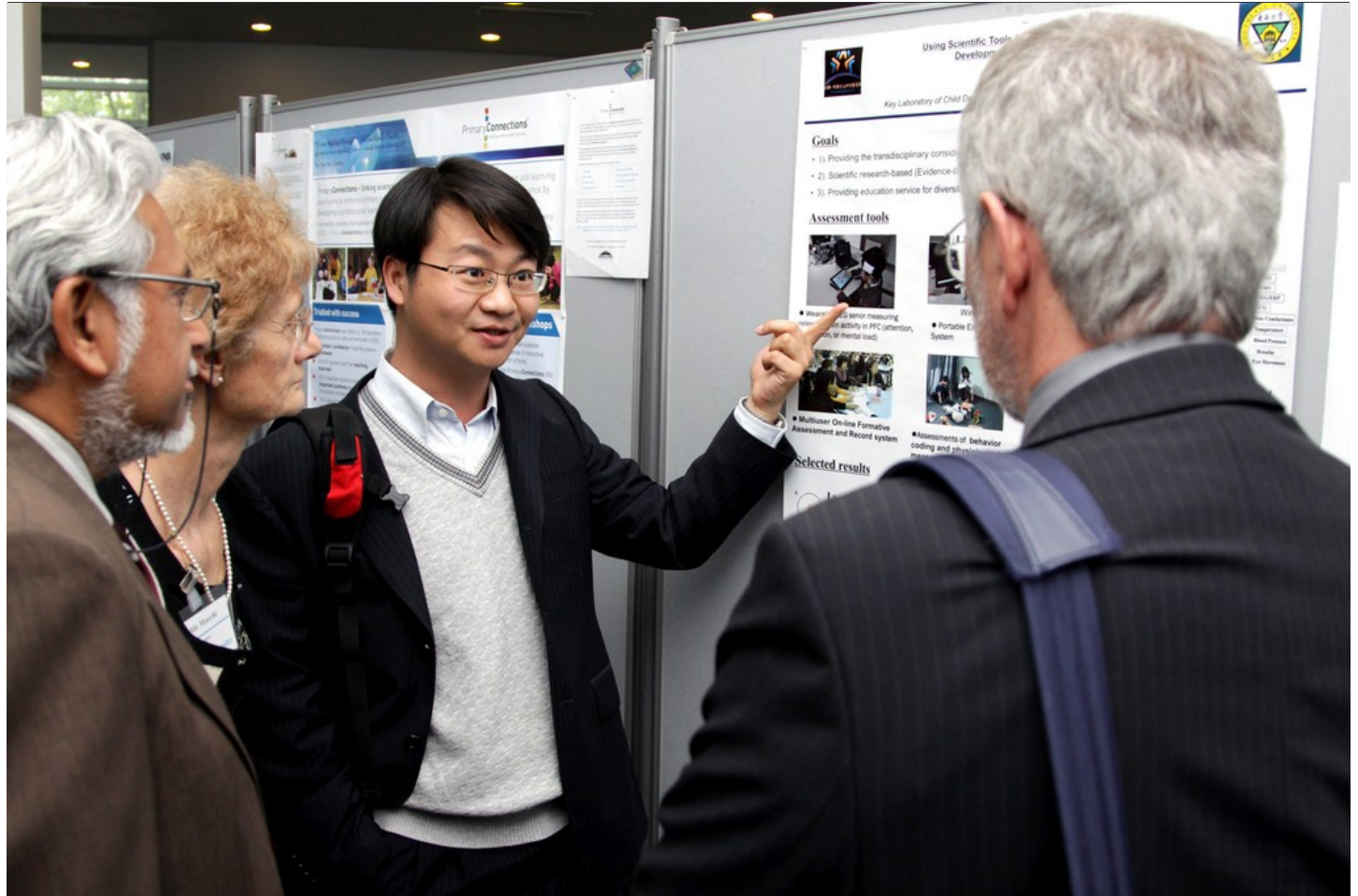
[EJYSE journal for young researchers »](#)
[Millennium Youth Camp »](#)
[MyScience webmagazine for youth »](#)

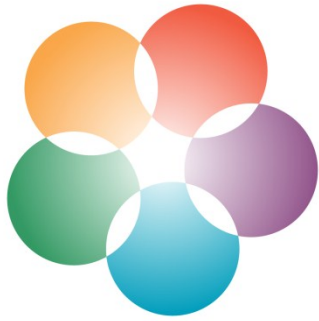
- Beetles fighting against climate change
- Finding the ancient in a



International Symposium on Science Education (ISSE)

**ISSE 2014:
ICT in
Science
Education,
Oct 2014**





NFSUN 2014



The Nordic Research Symposium on Science Education is a forum for the presentation and discussion of research on Nordic science education.

The symposium links research and development and **welcomes researchers, as well as teachers from all levels of education.**

4th – 6th June 2014

at the University of Helsinki

at Kumpula Science Campus, Helsinki, Finland

Deadline for submission of proposals:

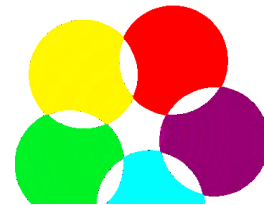
31st January 2014



Services for teachers

- consulting
- borrowable teaching materials & equipment
- teachers can bring their students to authentic science labs/classrooms, e.g.
 - ChemistryLab *Gadolin*
 - ComputingLab *Linkki*
 - MathLab *Origo*
 - PhysicsLab *F2k*





Example:

ChemistryLab Gadolin

Kemma Chemistry Centre

Department of Chemistry

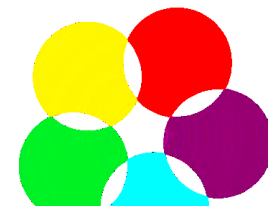
University of Helsinki

Finland

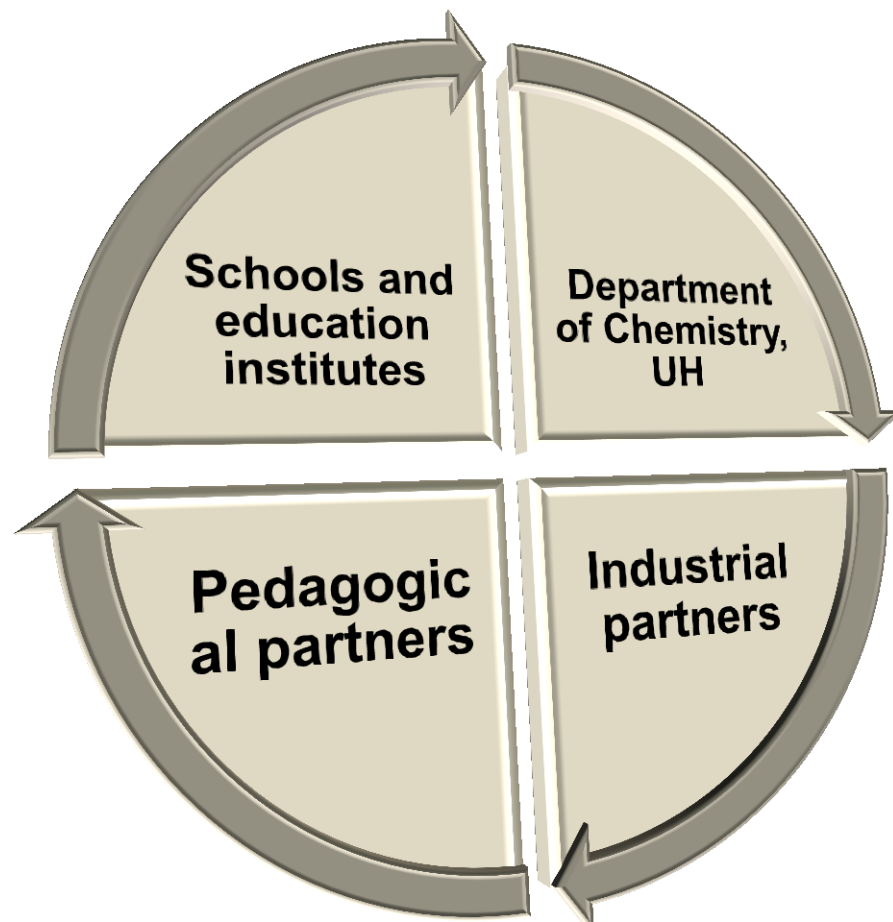




Gadolin is a collaboration project



- ChemistryLab Gadolin was founded in 2008.
- **21 partners**
- It is **free of charge** for schools.





HELSINGIN YLIOPISTO

Kemian laitos &
Farmasian tiedekunta



OPETUSHALLITUS
UTBILDNINGSSSTYRELSEN



Helsingin kaupunki
Opetusvirasto

MAOL



KEMIANTEOLLISUUS RY



SUOMEN BIOTEOLLISUUS
FINNISH BIOINDUSTRIES



Metrohm
Nordic



Thermo
SCIENTIFIC



SUOMEN KEMIAN SEURA

Kemiska Sällskapet i Finland - Association of Finnish Chemical Societies

NESTE OIL

BASF
The Chemical Company



kemira

A Member of
The Linde Group

AGA



BOREALIS

PLD
FINLAND

VWR

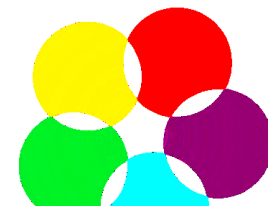
IS-VET

3M

BRUKER



Goals

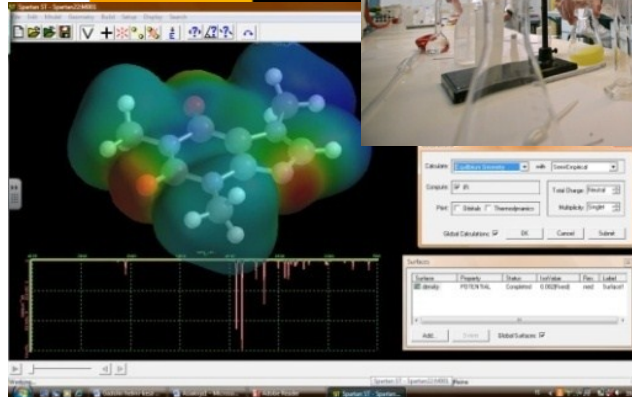
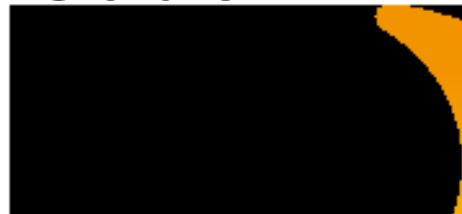


- To support chemistry teaching and learning.
- To rise the youth's interest in natural sciences.
- To support the potential future professionals, i.e. to introduce career possibilities in the field of chemistry.
- **To bring out the up-to-date information on the versatile applications of chemistry, and its important status in industry and in the society.**
- To promote the positive image of chemistry.
- To support the goals of schools, universities, enterprises of chemistry, enterprises and other partners.



Visits to ChemistryLab Gadolin

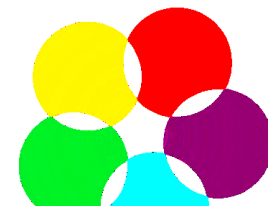
- Over 4000 visitors from schools / year
- Visits include (1-8 hours / visit)
 - Introduction of ChemistryLab Gadolin, The Department of Chemistry, The UH and The Campus
 - Laboratory work
 - Molecular modelling
 - Visits to research groups







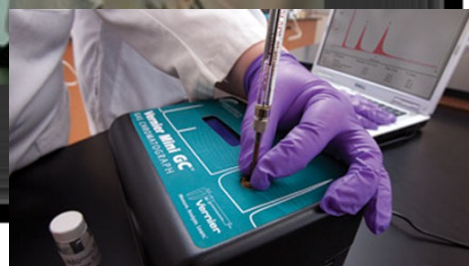
Meeting scientists



Gadolin offers student groups the **opportunity to meet scientists** at the Department of Chemistry, the University of Helsinki and to **discuss** with them about chemistry and visit their research laboratories.



Collaborating with chemical industry



Muovien tunnistus FT-IR-laitteella

Toukokuun 2010 kuukaudentyö
Kemianluokka Gadolin



www.brukeroptics.com





Using design research for developing new educational innovations



- ChemistryLab Gadolin also is a research laboratory for chemistry learning and teaching
- It is collaborating with the Unit of Chemistry Teacher Education in the Department of Chemistry
- Activities are developed through design research
- M.Sc. thesis and other publications





Joy of math, science and technology for everyone!



More information (and links to the webmagazines)

- www.luma.fi/centre
- www.luma.fi/news