

# ConvMathAssist and the Klein Project

<http://kleinproject.org>

Tomás Recio

Universidad de Cantabria

[www.recio.tk](http://www.recio.tk)

## ▼ Goal

> In 2008 [IMU](#) and [ICMI](#) commissioned a project (the Klein Project) to revisit the intent of Felix Klein when he wrote *Elementary Mathematics from an Advanced Standpoint* one hundred years earlier.

Felix Klein was the founder of ICMI.

> A digital version (in Spanish) appears at

[http://dmle.cindoc.csic.es/info\\_gnral.php](http://dmle.cindoc.csic.es/info_gnral.php)

> The aim is to produce a book for upper secondary teachers that communicates the breadth and vitality of the research discipline of mathematics and connects it to the senior secondary school curriculum.

>The 300-page book, prepared in more than 10 languages, will be written to inspire teachers to present to their students a more informed picture of the

growing and interconnected field represented by the mathematical sciences in today's world.

> We expect this will be backed up by web, print, and DVD resources.

## ▼ **Design Group**

- Michèle Artigue, Université Paris Diderot, France
- Ferdinando Arzarello, Università degli Studi di Torino, Italy
- Bill Barton, The University of Auckland, New Zealand (chair)
- Graeme Cohen, University of Technology, Sydney, Australia
- William (Bill) McCallum, University of Arizona, USA
- Tomas Recio, Universidad de Cantabria, Spain
- Christiane Rousseau, Université de Montréal, Canada
- Hans-Georg Weigand, Universität Würzburg, Germany

## ▼ **The Book**

- Introduction
- Topic Chapters

Arithmetic

Logic

Algebra & Structures

Geometry

Functions & Analysis

Discrete & Algorithmic Mathematics

Computational Mathematics

Probability & Statistics

- Theme Chapters

Intradisciplinarity (i.e. internal connections)

Mathematics as a living discipline inside science and society

How mathematicians work

## ▼ Klein Vignettes

[http://wikis.zum.de/dmuw/index.php/Klein\\_Vignettes](http://wikis.zum.de/dmuw/index.php/Klein_Vignettes)

> Klein Vignette Criteria

- Type 1: Trajectories connecting school mathematics with advanced and recent aspects of the field of mathematics.

- Type 2: Explanations of modern significant applications

- > Both types should start with an Inspiring Example or Problem that connects to the culture of the school teacher.

The material from the field of mathematics should show teachers something beyond what they know, (even if it may not be at the boundary of mathematics).

- > Type 1 will need to have “transitional objects” or a “chain of linkages” that take the teachers to the edge of the ocean so they can see the horizon—or sail a little way towards it.

- > Both types need to have in mind the reader listening and asking “Why is this important?”, and the answer should be scientifically deep. It must tell something about mathematics, or about the role of mathematics inside science and technology, or about how mathematics develops in general terms.

- > It should have a mathematical moral (which needs to be explicitly stated). It should go inside the mathematics and not just tell us that there is mathematics hidden inside that topic.

- > The vignettes need to be written in the awareness of the role of technology without allowing it to dictate the content.

- > All vignettes should be short and focused, most of them having 2-4 pages. Vignettes should be written in a self-contained way, even if hierarchies of papers pushing the topic further are also encouraged.

- > Attention should be put on providing references, especially those that take the topic further, and related websites would either give more information on the topic or provide teacher resources.

## ▼ Klein Conferences

The first Klein Conference was held in Madeira, Portugal, from 1-4 October, 2009. There were about 100 participants, predominantly from Portugal and Brazil. <http://glocos.org/index.php/dm-md/dm-md2009>

The second Klein conference was held in Castro-Urdiales (Spain, near Santander) from 2-5 June 2010. Around 40 delegates of all mathematical societies and teachers societies from Spain. <http://www.ciem.unican.es/encuentros/klein/> Download contributions from <http://www.ciem.unican.es/encuentros/klein/node/5>

A UK Klein Workshop was recently held on 18th June, 2010, in the Faculty of Education, Oxford University. <http://www.mathstore.ac.uk/index.php?pid=282>

The [James R. Leitzel Lecture](#) and an accompanying [special session](#) at [Mathfest 2010](#) in Pittsburg, 6-7 August 2010, will be devoted to the Klein Project.

## ▼ How to contribute

> Contributions of all kinds are welcomed by the Design Group.

> You are welcome to send material by email to

Bill Barton <b.barton@auckland.ac.nz>

or to any other member of the Group.

> At this time we are soliciting in particular Klein Vignettes and comments on the Book Structure.

<http://kleinproject.org/>

## ▼ ConvMathAssist

Possible themes for contribution to the Klein Project:

**Convergence by extending application areas:** To which areas could the application of a specific MMA be extended to (university – high school, mathematics/computer science – biology/chemistry/physics/...) ?

**Convergence on common foundations:** How can mathematics and logics underlying an MMA be made comprehensible for users ?

**Convergence in user requirements:** How can algorithms of symbolic computation, indispensable for applied mathematics (integration, cancellation of multivariate polynomials etc), be made self explanatory ?