The 5th workshop in Montestigliano, Italy will cover modern computational techniques for very rapidly and accurately solving integral and partial differential equations. Active involvement, close mentoring and tutorial presentations by an invited guest speaker and the organizers will be offered to ensure a lasting impact on the students’ doctoral research. The key-note speaker is Prof. Gunnar Martinsson from the University of Colorado at Boulder.

**Topic**

Fast solvers for elliptic PDEs such as the Laplace and Helmholtz equations have come to form key building blocks in scientific computing. Elliptic PDE’s are encountered in the governing equations in many branches of physics, but they also arise in implicit time integration schemes of dynamical systems. While fast methods for such problems have traditionally been based on iterative solvers (e.g. GMRES, multigrid) recent developments have enabled the construction of linear complexity direct solvers which in a single step construct an approximation to the solution operator of the problem. This workshop addresses direct methods that are robust, stable, fast and under certain conditions outperform state-of-the-art iterative methods.

**Format**

The key-note speaker gives two lectures and provides a set of problems to be solved by the students collaborating in groups. Scientific supervision will be provided by the invited speaker and the organizers. The students will at the end of the workshop present their work and write a short report.

**Dates**

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<th>Activity</th>
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<td>Deadline for application</td>
<td>February 10, 2012</td>
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<tr>
<td>Preparation for workshop</td>
<td>March 10-25</td>
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<td>Arrival of participants</td>
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<td>Lecture by G. Martinsson</td>
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**Workshop venue**

The workshop will take place at the picturesque estate of Montestigliano in the heart of Tuscany. The village of Montestigliano is composed of 18th century buildings, typically of Tuscan architecture. Located 15 km south-west of Siena, it provides a stunning landscape and a stimulating environment for intensive work and relaxation alike.

**How to apply**

Interested candidates should send a CV and a motivation-letter including a short summary of their research to info@montestigliano-workshop.com by 10th February 2012. Twelve doctoral students will be selected on a competitive basis by a panel review involving the organizers and the guest speaker. Basic knowledge of numerical methods and programming is required. Selected candidates will receive a fellowship, which will cover registration fee and accommodation. Travel costs are not covered.

**Organizers**

Prof. Peter Schmid (LadHyx/École Polytechnique, France), Prof. Francois Gallaire (EPFL, Switzerland), Dr. Fulvio Martinelli (LadHyx, /École Polytechnique, France) and Dr. Shervin Bagheri (KTH Sweden).