Laudatio for Antonio SEGATTI

Antonio Segatti is an excellent researcher and a nice person with good character, able to work hard in scientific research and to smoothly cooperate with other people as a collaborator or a colleague. He studied Mathematics at the University of Pavia and he got his master degree *summa cum laude* in September 2002. In his master thesis he proved the well-posedness of a model for shape memory alloys with prescribed temperature and unknown displacements and order parameter.

During the years 2003–2006, Antonio Segatti held a doctoral position at the University of Milano and carried out an intensive research activity leading him to get his PhD degree with the noteworthy thesis "Global attractors for some evolution systems without uniqueness". Concerning the content of the thesis, let me point out that Segatti realized that the generalized semiflow theory developed by J. Ball for Navier-Stokes equations could be used for other evolution problems in which the uniqueness property is not clear or fails to hold. As applications, he studied an abstract doubly nonlinear evolution equation, proving the existence of a unique global attractor, as well as gradient flows of non convex functionals, including quasistationary phase field models, and hyperbolic relaxation of the Cahn Hilliard equation in 3-D.

There are further significant contributions of Antonio Segatti during the doctoral years. In particular, a model for the evolution of damaging in viscoelastic materials has been investigated in collaboration with E. Bonetti and G. Schimperna. The model, taking viscosity effects into account, describes the phenomenon of damage by means of the dynamical law for an order parameter representing the proportion of damaged material, by coupling it with the evolution of deformation. Moreover, a study of the long time

behaviour and the convergence of the entire trajectory for a family of doubly nonlinear evolution equations has been carried out in collaboration with G. Schimperna and U. Stefanelli.

In 2006–2008 he spent more than two years at the WIAS in Berlin with a postdoc position. Then, from 2009 to the beginning of 2015 he had a permanent position as Assistant Professor of Mathematical Analysis at the University of Pavia. Moreover, he has been promoted to the position of Associate Professor in the Mathematics Department of the University of Pavia by the end of March of this year 2015. The research activity by A. Segatti in these recent years comprehends

– a joint study with M. Grasselli, G. Schimperna, S. Zelik to investigate the global and exponential attractors for the 3-D Cahn-Hilliard equation with inertial term, in the case where the initial data are suitably bounded and consequently the system is well posed;

– a project with R. Rossi, G. Savarè, U. Stefanelli focusing on a novel variational approach to gradient flows in metric spaces. Attractors and curves of maximal slopes are analyzed;

– in the framework of micro-macro transitions, an investigation, performed jointly with M. Herrmann, fitting in the area of multiscale analysis and examining transitions from an atomic discrete system to a macroscopic continuum model;

– the proof of the finite dimension of the global attractor for some parabolic obstacle type problems, in which the variable is a vector of unknowns constrained to lie in convex set, typically the $n-$simplex, in a collaboration with S. Zelik;

– the production of families of complete non compact Riemannian metrics with positive constant σ_k-curvature, the problem being equivalent to solve a second order fully nonlinear elliptic equation. This result comes out from a collaboration with L. Mazzieri;

– the study, with H. Wu, of hydrodynamic systems modelling the Smectic-A liquid crystal flow. Navier-Stokes equations for the fluid velocity are coupled with a fourth-order equation for the layer variable, and the long-time behavior of the solutions is analyzed in a sharp and rather complete way;

– the analysis, in collaboration with M. Snarski and M. Veneroni, of elastic surface energies to model thin films of nematic liquid crystals. It is shown how an approach taking into account the extrinsic properties of the surfaces coated by the liquid crystal leads to considerable differences with respect to the classical intrinsic energy.

In his research work, Antonio Segatti is constantly interested to the *mechanical* and *mathematical* aspects of the problems he is investigating. His publications are thus characterized by a combination of taste for mechanical questions and refined mathematical techniques. Antonio Segatti is a talented and hard working researcher and possesses the indispensable features to make a brilliant career as scientist.

Pierluigi Colli   *June 2015*