Antonio Marigonda (amarigo@[nospam]math.unipd.it[1]), Dipartimento di Matematica, Università di Roma "La Sapienza", P. le Aldo Moro, 2, 00185 Roma, Italy, *Differentiability Properties for a Class of Non-Lipschitz Functions and Applications* (203 Prescott Hall, Tuesday May 23rd, 2:15-3:00).

We study a class of non-Lipschitz functions, close to semiconvex functions, enjoying remarkable regularity properties. These functions are characterized by a geometric property of their epigraphs called φ-convexity (or, according to other authors, proximal smoothness or the positive reach property). Equivalently, there is a neighborhood of their epigraph where the distance function to the epigraph is of class $C^{1,1}$ (i.e., it has a Lipschitz continuous differential). It has been proved that there is a full-measure subset of the domain where the function is actually locally semiconvex, hence a.e. twice differentiable. Analogously to the corresponding work of P. Cannarsa and C. Sinestrari, the structure of the singular set and the problem of propagation of singularities have been studied. The results have been applied to viscosity solutions of Hamilton–Jacobi equations, and to give some new regularity properties for the minimal time function for the linear optimal control problem with convex target in the case where controllability assumptions do not provide Lipschitz continuity of minimal time function (generalizing a result of P. Cannarsa and C. Sinestrari). All the results have been obtained in joint work with Giovanni Colombo (from the University of Padova, Italy) and Peter R. Wolenki (from Louisiana State University, Baton Rouge, Louisiana, USA) including the following:

[1] Colombo, G., and A. Marigonda, "Differentiability properties for a class of non-convex functions," *Calculus of Variations and Partial Differential Equations*, Volume 25, Number 1, January 2006, pp. 1–31.

[2] Colombo, G., and A. Marigonda, "Singularities for a class of non-convex sets and functions, and viscosity solutions of some Hamilton-Jacobi equations," preprint.

[3] Colombo, G., A. Marigonda, and P. Wolenski, "Some new regularity properties for the minimal time function," *SIAM Journal on Control and Optimization*, Volume 44, Issue 6, 2006, pp. 2285–2299.

Biographical Sketch. Antonio Marigonda was born in Rome, Italy. He received his Laurea degree summa cum laude in Pure and Applied Mathematics Sciences from the University of Padova. He earned his Ph.D. in Mathematics from University of Padova in 2006 under the direction of Giovanni Colombo. Since February 2006, he has held a temporary position enrolled in the research project "Viscosity, Metric, and Control Theoretic Methods for Nonlinear PDEs" at the University of Roma La Sapienza. His publications are on nonsmooth analysis, optimal control and Hamilton-Jacobi equations.

[1] The [nospam] should be omitted when sending email. It was included here to avoid automatic "harvesting" by spam-list makers.