

UNIVERSITY OF KENTUCKY  
COLLEGE OF ARTS AND SCIENCES  
DEPARTMENT OF MATHEMATICS  
Professor John Lewis (859) 257-1153  
765 Patterson Office Tower john@ms.uky.edu  
Lexington, Kentucky 40506-0027 FAX No. (606) 257-4078

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Dear Colleagues

This letter is in support of the application of Professor Kaj Nyström from the University of Umeå, who is applying to be a research member of MSRI during January 10, 2011 to May 20, 2011. He would like to participate in the MSRI program entitled, 'Free boundary problems, theory, and applications.' Kaj and I have written some joint papers which deal either directly or indirectly with free boundary problem. A listing of these papers follows.

- [1] S. Hofmann, J Lewis, and K. Nyström, *Existence of Big Pieces of Graphs for Parabolic Problems*, Ann. Acad. Sci Fenn. Math. **28** (2003), no. 2, 355-384.
- [2] S. Hofmann, J Lewis, and K. Nyström), *Caloric Measure in Parabolic Flat Domains*, Duke Math. J. **122** (2004), no. 2, 281-345.
- [3] J. Lewis and K. Nyström *On a Parabolic Symmetry Problem*, Rev. Mat. Iberoam. **23** (2007), no. 2, 513-536.
- [4] J. Lewis and K. Nyström *Boundary Behaviour for  $p$  Harmonic Functions in Lipschitz and Starlike Lipschitz Ring Domains* , Ann. Sc. École Norm. Sup. (4) **40** (2007), no. 4, 765-813.
- [5] J. Lewis and K. Nyström *Boundary Behaviour and the Martin Boundary Problem for  $p$  Harmonic Functions in Lipschitz Domains* to appear in Annals of Mathematics.
- [6] J. Lewis and K. Nyström, *New Results on  $p$  harmonic functions*, to appear in Pure and Applied Math Quarterly.
- [7] J. Lewis and K. Nyström, *Regularity and Free Boundary Regularity for the  $p$  Laplacian in Lipschitz and  $C^1$  Domains*, Ann. Acad. Sci. Fenn., **33** (2008), 1 - 26.
- [8] J. Lewis and K. Nyström, *Boundary Behavior of  $p$  Harmonic Functions in Domains Beyond Lipschitz Domains*, Advances in the Calculus of Variations, **1** (2008), 1 - 38.
- [9] J. Lewis and K. Nyström, *On Infinity Harmonic Functions in the Plane*, Proc. of Amer. Math. Soc. **136**, no. 4, 1311-1323.

- [10] J. Lewis, N. Lundström, and K. Nyström, *Boundary Harnack Inequalities for Operators of  $p$  Laplace Type in Reifenberg Flat Domains*, Proceedings of Symposia in Pure Mathematics. **79** (2008), 229-266.
- [11] J. Lewis, K. Nyström, and P. Poggi- Corradini,  *$p$  Harmonic Measure in Simply Connected Domains*, submitted.
- [12] J. Lewis and K. Nyström, *Regularity of Lipschitz Free Boundaries in Two Phase Problems for the  $p$  Laplace Operator*, to appear Advances in Mathematics.

[1], [2], are nearly complete parabolic generalizations of several papers of Kenig - Toro. [12] is a direct generalization to  $p$  harmonic functions of an important theorem of Caffarelli on the regularity of Lipschitz free boundaries.

Kaj is a relatively young researcher (early forties) who should interact easily with postdocs, students, and more senior mathematicians at the Institute.

Sincerely,

John Lewis