

# RESUME

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## Research Interests:

Computational bioheat transfer, simulation of biological flows, hyperthermia, percolation networks and fractal interpolation functions to describe tumor perfusion

## Education:

Ph.D.: 1998, Mechanical Engineering and Materials Science, Duke University, Durham, NC

Thesis Title: "*Influence of Blood Vessel Networks on Hyperthermia Induced Temperature Distributions*", Advisor: Prof. Scott T. Clegg.

M.S.: 1992, Mechanical Engineering, "Politehnica" University of Bucharest, Romania

Thesis: "*Finite Time Thermodynamics Applied to Refrigeration Systems Optimization*", Advisor: Prof. Vsevolod Radcenco.

## Graduate Courses:

Conduction Heat Transfer, Convection Heat Transfer, Fluid Mechanics, Computational Fluid Mechanics and Heat Transfer, Finite Element Method, Numerical Analysis, Biological Materials, Drug Delivery, Advanced Engineering Thermodynamics, Refrigeration Systems, Cryogenics.

## Skills:

Programming languages: Fortran, C

Operating systems: Unix, Windows 95/88, Mac OS

Software packages: FIDAP, AVS, Matlab, AutoCad

Foreign Languages: fluent Romanian, reading Spanish, French and Italian

## Experience:

1998-present: Research Associate, Hyperthermia Group, Thermal Modeling Core, Radiation Oncology Dept., Duke University Medical Center

*Fields of research:* thermal modeling, fractal analysis applied to microvascular networks and tumor perfusion characterization, fractal interpolation functions to reconstruct the 3D tumor perfusion distribution

1995-1998: Research Assistant, Hyperthermia Project, Thermal Modeling Core, Radiation Oncology Dept., Duke University Medical Center

*Fields of research:* modeling bioheat transfer and biological flow, percolation theory applied to tumor vessel network growth

1994-1995: Research Assistant, Heat Transfer Laboratory, MEMS Dept., Duke University, NC

*Fields of research:* computational heat transfer and fluid flow applied to the study of water-molten material interactions

1992-1994: Assistant Professor, Thermodynamics and Heat Engines Dept., "Politehnica" University of Bucharest, Romania.

*Field of research:* finite time thermodynamics optimization of refrigeration systems

*Teaching experience:* seminars in thermodynamics, heat transfer and fundamentals of refrigeration systems

## **Published Materials:**

### *Book Chapters*

1. Radcenco, V., Apostol, V. and Craciunescu, O., 1998, "Refrigeration Systems, Heat Pumps, Cryogeny", in Engineering Thermodynamics, Eds. Marinescu, M., Baran, N. and Radcenco, V., Matrix Rom, pp. 589-642 (in Romanian).

### *Peer Reviewed Journal Papers*

1. Craciunescu, O.I., Howle, L.E. and Clegg, S.T., "Experimental Evaluation of the Thermal Properties of Two Tissue Equivalent Phantom Materials", International Journal of Hyperthermia, vol. 15, no. 6, 509-518, 1999.
2. Craciunescu, O.I., Das, S. K. and Clegg, S.T., "Dynamic Contrast-Enhanced MRI and Fractal Characteristics of the 2D Tumor Perfusion Percolation Cluster", ASME Journal of Biomechanical Engineering, vol. 121, 480-486, 1999.
3. Craciunescu, O., Bejan, A., Cacuci, D. and Schatz, W., "Time-dependent Interaction between Water at Supercritical Pressures and a Hot Surface", Numerical Heat Transfer, Part A: Applications, vol. 30 (6), 355-375, 1996.
4. Craciunescu, O.I., Samulski, T.V., MacFall, J.R. and Clegg, S.T., "Perturbations in Hyperthermia Temperature Distributions Associated with Counter-Current Flow: Numerical Simulations and Empirical Verification", in print, IEEE Transactions on Biomedical Engineering, 1999.

5. Craciunescu, O.I. and Clegg, S.T., "Pulsatile Blood Flow Effects on Temperature Distribution and Heat Transfer in Rigid Vessels", resubmitted to ASME Journal of Biomechanical Engineering, 1999.
6. Craciunescu, O.I., Das, S.K. and Samulski, T.V., "Three-Dimensional Tumor Perfusion Reconstruction Using Fractal Interpolation Functions", submitted to IEEE Transactions on Biomedical Engineering, 1999.
7. Craciunescu, O.I., Das, S.K., McCauley R.L. and Samulski, T.V., "3D Reconstruction of the Hyperthermia Induced Temperature Distribution in Human Sarcomas Using DE-MRI Measured Tissue Perfusion: Validation Against Non-Invasive MR Temperature Measurements", prepared for submission to Medical Physics, January 2000.

*Conference Proceedings*

1. Craciunescu, O., Das, S.K. and Dewhirst M.K., "Three-dimensional Microvascular Networks Fractal Structure: A Potential for Tissue Characterization?", Advances in Heat and Mass Transfer in Biotechnology, HTD, vol. 363, 9-13, 1999.
2. Craciunescu, O. and Clegg, S.T., "Towards the Understanding of Blood Perfusion in Tumor Vascular Networks Using Contrast Enhanced MRI and Invasion Percolation", Advances in Heat and Mass Transfer in Biotechnology, HTD, vol. 362, 143-147, 1998.
3. Craciunescu, O. and Clegg, S.T., "Perturbations of Large Vessels on Induced Temperature Distributions. Part A: Three-dimensional simulation study", Advances in Heat and Mass Transfer in Biotechnology, HTD, vol. 355, 193-198., 1997.
4. Apostol, V., Radcenco, V. and Craciunescu, O. " The Effect of Pressure Losses and of the Intake Degree on the Cryogenic Expander Optimization", Congresso Nazionale di Termodinamica, Padova, 1994.
5. Craciunescu, O.I., Das, S.K. and Samulski, T.V., "Piecewise Fractal Interpolation Models to Reconstruct the Three-Dimensional Tumor Perfusion", submitted to Chicago 2000 World Congress on Medical Physics and Biomedical Engineering, Chicago, 2000.
6. Craciunescu, O.I., Das, S.K., MacCauley, R.L. and Samulski, T.V., "Hyperthermia Induced 3D Temperature Distribution in Human Sarcomas with Tumor Perfusion Reconstructed Using Fractal Interpolation Functions", abstract submitted for ASME 2000 Conference, Orlando, Florida.

*Published Abstracts*

1. Craciunescu, O., Das, S.K. and Dewhirst, M.W., "Three-Dimensional Microvascular Networks Characterization Using Fractal Analysis", Eighteenth Annual Meeting of the North American Hyperthermia Society, April 8-10, 1999, Philadelphia, PA, P42-31.
2. Craciunescu, O. and Clegg, S.T., "Contrast-Enhanced MRI and Invasion Percolation to Describe Blood Flow Perfusion in a Two-Dimensional Tumor Vascular Network", Seventeenth Annual Meeting of the North American Hyperthermia Society, April 25-29, 1998, Louisville, Kentucky, P24-460.

**Editorial Responsibilities:**

Manuscript reviewer for the following peer-refereed scientific journals and conference proceedings:

1. International Journal of Hyperthermia
2. National Heat Transfer Conference

**References:**

Available upon request

**Honors/Prizes/Affiliations:**

1994-1998: Departmental Fellowship - Duke University, MEMS Dept.

1992: 1st prize at the Student Paper Contest, "Politehnica" University of Bucharest, Romania.

American Society of Mechanical Engineers (ASME) Associate Member since 1996: Bioengineering Division  
Heat Transfer Division

IEEE Engineering in Medicine and Biology Society (IEEE EMB) Member since 1999