TABLE OF CONTENTS

CONFERENCE ON THE MACROSCOPIC PROPERTIES OF DISORDERED MEDIA

June 1-2-3, 1981

COURANT INSTITUTE, NEW YORK UNIVERSITY, 251 MERCER STREET,
NEW YORK, N.Y. 10012

MONDAY JUNE 1

9:00 - 9:40	R. Burridge, Courant Institute, Poroelastic equations from microstructure
9:40 - 10:20	P. Saffman, Cal. Inst. Tech., Fingering in porous media
10:20 - 10:40	BREAK
10:40 - 11:20	J. Berryman, Bell Laboratories, Elastic waves in fluid-saturated porous media
11:20 - 12:00	S. Childress, Courant Institute, Approximations of Brinkman type
12:00 - 1:30	LUNCH
1:30 - 2:10	R. O'Connell, Harvard Univ., Porous media, self-consistent methods
2:10 - 2:50	D. Johnson, Schlumberger-Doll, Elastodynamics in porous fluid-saturated solids
2:50 - 3:10	BREAK
3:10 - 3:50	V. Twersky, Univ. of Illinois, Chicago Circle, Propagation and attenuation in composite media
3:50 - 4:30	J. Lebowitz, Rutgers Univ., Kinetics of cluster growth in quenched alloys
4:30 - 5:10	L. Tartar, Univ. of Paris Orsay, Optimal bounds in homogenization and applications
5:10 - 5:50	D. J. Bergman, Tel Aviv University, Resonances in the bulk properties of composite media -- theory and applications

TUESDAY JUNE 2

9:00 - 9:40	N. Ashcroft, Cornell University, Electromagnetic propagation in mixed media
9:40 - 10:20	Ping Sheng, Exxon Res., 'Structural units' and the effective medium calculation of composite dielectric constants
10:20 - 10:40	BREAK
10:40 - 11:20	G. Papanicolaou, Courant Institute, Upper and lower bounds for conductivities in random media
11:20 - 12:00	I. Webman, Courant Institute, Diffusion on random networks
12:00 - 1:30	LUNCH
1:30 - 2:10	M. Cohen, University of Chicago, Topology, geometry and physical properties of porous rocks
2:10 - 2:50	M. Lax, City University of N.Y., Coherent medium approach to hopping conductivity

CONFERENCE PROGRAM, continued

Tuesday, continued

2:50 - 3:10 BREAK

3:10 - 3:50 P. Sen, Schlumberger Res., A self-similar model for acoustic and electrical response in rods

3:50 - 4:30 T. Odagaki, City University of N.Y., Hopping conduction in one dimensional chains

4:30 - 5:10 M. Vogelius, Courant Institute, A projection method applied to diffusion in a periodic structure

WEDNESDAY JUNE 3

9:00 - 9:40 A. Acrivos, Stanford University, Slow flow and heat transfer past isotropic arrays of spheres and cylinders

9:40 - 10:20 J. Percus, Courant Institute, Fluctuation corrections to the mean field description of a nonuniform fluid

10:20 - 10:40 BREAK

10:40 - 11:20 J. B. Keller, Stanford University, Reflection and scattering from rough surfaces

11:20 - 12:00 R. V. Kohn, Courant Institute, Homogenization as a tool for engineering design optimization

12:00 - 1:30 LUNCH

1:30 - 2:10 D. Drew, Rensselaer Poly. Inst., Wave propagation in a bubbly liquid

2:10 - 2:50 W. Kohler, Virginia Poly. Inst. and State Univ., Upper and lower bounds for effective parameters

2:50 - 3:10 BREAK

3:10 - 3:50 V.V. and V.K. Varadan, Ohio State Univ., Computation of the frequency dependence of the average dielectric constant in discrete random media

3:50 - 4:30 D. McLaughlin, Courant Inst. and Univ. of Arizona, Self consistent convection of flows with micro-structure

4:30 - 5:10 G. W. Milton, Cornell University, A comparison of two methods for deriving bounds on the effective conductivity of composites

The conference is sponsored by a grant from the Exxon Research Corp.

EDITORS' PREFACE

During the first three days of June, 1981, a conference was held at the Courant Institute on the macroscopic behavior of disordered media. We are grateful to the Exxon Research Corporation for the grant which made this conference possible.

The present volume contains most of the papers presented at this conference.

Research work on the macroscopic behavior of disordered media is very broad, ranging from applied engineering and experimental studies to more basic physics. It covers such diverse areas as numerical simulations, the numerical solution of phenomenological macroscopic equations, and mathematical investigations of the validity of macroscopic equations obtained from microscopic laws. In order to facilitate communication between the participants and to limit the length of the conference we decided to focus attention on the passage from microscopic to macroscopic laws and associated mathematical problems. We therefore excluded experimental and numerical studies. However, even within the areas selected, we left many problems such as localization, surface effects, fluid mixtures, etc., unrepresented.

During the course of the conference it became clear that there is a significant concentration of scientists in the New York metropolitan area actively engaged in research on macroscopic effects. Professor Morrel Cohen suggested that perhaps an informal conference among specialists take place annually (or more frequently) in order to exchange ideas and identify problems of theoretical and applied interest.

We expect to hold such an informal gathering at the Courant Institute in early summer 1982.

R. Burridge, S. Childress, G. Papanicolaou