Dedication

The editors, Stewart Aitchison and George Stegeman, wish to dedicate this issue on spatial solitons to their late friend and colleague *Gustavo E. Torres-Cisneros* who passed away early this year from cancer at the age of 38. All who knew him are diminished and saddened by his loss. He was a man who gave selflessly of himself, to his family, to his colleagues, to the cause of optics in Mexico, to the mentoring of graduate students, and to the education of young children in a school which he established. We will all miss his great sense of humor and his warm, embracing smile.

Gustavo graduated with honors from the Instituto Technologico de Estudios Superiores de Monterey. He had risen to the position of a Titular Researcher at the Universidad de Guanajuato when he passed away. In a separate endeavor, also in Guanajuato, he formed the Grupo Educativo IMA, a learning center for teaching children between the ages of 6 and 12. He was also the Vice President of the Mexican Academy of Optics.

He became interested in spatial solitons about 5 years ago and has been a continuing contributor to the field since. When his colleagues at INOE initiated experiments on solitons and showed him an early result in the laboratory, Gustavo is quoted as saying Now I can die, I have seen a soliton. His last paper with his students appears in this special issue.

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Special Issue on Spatial Solitons

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In the early days of nonlinear optics solitons were usually associated with a third order self-focusing nonlinearity. Within this model there were two basic families namely spatial and temporal solitons. As our understanding of the subject has grown, the number of varieties of spatial solitons has also increased [1]. Today anyone coming to the field is faced with a very diverse array of spatial solitons and solitary waves. There is also a growing inter-relationship between nonlinear optical physics and a range of other fields. Solitary waves occur in a number of naturally occurring systems, indeed the first recorded observation was John Scott-Russell's observation of a solitary wave in the Union canal, Scotland. There are a large number of electrical, biological and material effects which can be described using soliton theory and the concept of solitary waves.

Spatial solitons and nonlinear optics provides an ideal laboratory for the study of solitary waves. As a result interest in this subject has increased very significantly over the last decade. Indeed, searching scientific databases reveals a large number of papers covering an increasingly broad area. This special issue on spatial solitons comes at a time when the field is undergoing rapid advances in both theory and experimentation.

We have invited a small number of papers which review advances in 1) spatial soliton experiments, 2) theory of Kerr solitons and 3) the theory of quadratic solitons. We hope these papers will provide the reader with an overview of each of these areas and provides references which will stimulate further reading. In addition to the invited review papers we have received 19 contributed papers on a wide variety of current issues. These papers fall broadly into two sub-groups: a) Kerr and Kerr-like solitons and b) Quadratic and Photorefractive solitons.

The traditional view of a spatial soliton is based on the compensation of diffraction with the nonlinear self-focusing induced by the optical field. However, as recent research is demonstrating, Kerr and Kerr-like spatial solitons are a much more complex phenomena. For example, such solitons can be stabilised in 2D in the presence of a fifth order nonlinearity, single polarisation experiments have been extended to include both coherent and incoherent coupling. In addition, there is a family of dark spatial solitons in both one- and two-dimensions, which in turn produce vortex solutions. The special issue contains papers which address many of these issues and help to expand future directions for research.

One area which has seen a major development in recent years is based on spatial solitons in second order materials. These solitons extend our traditional view of spatial solitons and require us to dispense with the view that a spatial soliton require a third order nonlinearity. A variety of bright and dark spatial solitons have been observed in photorefractive media, during second harmonic generation and optical parametric effects. Again this growing interest is reflected in the number and breadth of papers in this special issue.

We hope that this special issue will serve as a reference tool and as a snap-shot of the current state of the art. The papers have been of a very high quality and have concentrated on a range of topics. Finally, we would like to thank Alan Miller for his help and encouragement in producing this special issue.

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Reference

1. MOTI SEGEV and GEORGE STEGEMAN, Physics Today, August 1998