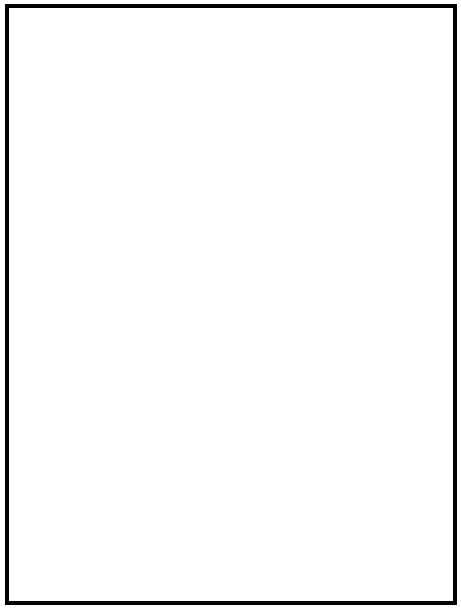
The CMS Prize Lectureship for Distinguished Research by Women in Mathematics was instituted in 1995 in recognition of outstanding research by a female mathematician. This award is presented in conjunction with the Canadian Mathematical Society's Summer Meeting.

Le prix de conférence SMC pour la recherche féminine, créé en 1995, rend hommage aux mathématiciennes qui se sont distinguées par leur apport exceptionnel à la recherche en mathématiques. Elle est présentée dans le cadre de la réunion d'été de la Société mathématique du Canada.

RECIPIENTS / RÉCIPIENDAIRES

1995	Nancy Reid
1996	Olga Kharlampovich
1997	Cathleen Synge Morawetz

The 3rd Krieger-Nelson Prize Lecture
Le 3ème Prix de conférence Krieger-Nelson



Cathleen Synge Morawetz
Courant Institute

1997 CMS Summer Meeting
Réunion d'été 1997 de la SMC
Winnipeg, Manitoba
June / juin 1997

BIOGRAPHICAL INFORMATION

Cathleen Morawetz received her Ph.D. at New York University in 1951 and her B.A. from the University of Toronto in 1945. She is Professor Emiritus of Mathematics at the Courant Institute of Mathematical Sciences, where she served as director from 1984 to 1988. She was the Jeffery-Williams Prize Lecturer in 1984, the first woman to be so honoured. She received the Lester R. Ford Award of the Mathematical Association of America in 1980 and was the first woman to be the J. W. Gibbs Lecturer of the American Mathematical Society in 1981. In 1990, she received honorary degrees from the University of Waterloo and the University of Toronto. In 1995, she became only the second woman to be elected as President of the American Mathematical Society in the Society's 105-year history. Besides her numerous professional activities, she has extensive service on the boards of trustees of Princeton, of the Sloan Foundation and of NCR. She is the daughter of former University of Toronto mathematician, J. L. Synge.

Existence problems in transonic flow

Cathleen Synge Morawetz

The setting for problems involving nonlinear partial differential equations of mixed type is described. Computational methods and possible existence theorems are discussed and compared to their analogues for hyperbolic problems. Finally an anachronism (v.Neumann's paradox) is demonstrated along with possible resolutions.

CITATION

Cathleen Morawetz is one of the leading mathematicians who has worked at the interface of mathematics and its applications. She has proved deep theorems about partial differential equations that have found important applications in aerodynamics, acoustics and optics. She has been an enormously positive influence for an entire generation of mathematicians interested in applications. In a series of three significant papers in the 1950s, she proved a striking new theorem for boundary value problems of mixed PDEs. This theorem led to the correct prediction that if one starts with a smooth, steady irrotational flow around an profile like a wing and changes slightly the shape of the wing, then, in general, there cannot be a smooth, steady transonic flow around the perturbed wing. Later she studied the scattering of waves from obstacles in the exterior of a region with Dirichlet boundary conditions. She proved, using new nonstandard energy identities, the first results on exponential decay of local energy in the exterior of star-shaped bodies. She is a rarity among mathematicians because her opinions, advice and judgment are widely sought in the larger circles of society beyond mathematics.

Cathleen Morawetz est l'une des mathématiciennes de pointe travaillant sur la frontière entre les mathématiques et ses applications. Elle a démontré des résultats sur les équations à dérivées partielles qui ont trouvé des applications importantes en aérodynamique, acoustique et optique. Elle a eu une influence énormément positive sur toute une génération de mathématiciens intéressés sur les applications. Dans une série de trois articles significatifs des années 50, elle a démontré un nouveau résultat à propos des problèmes de couplage d'équations aux dérivés partielles avec conditions limites. Ce théorème a conduit à la juste prédiction que si l'on prend par exemple une aile de silhouette lisse entourée d'un flux irrotationnel stable, et si la forme de cette aile est altérée légèrement, alors on ne peut espérer en général trouver un flux transonique stable et lisse autour de l'aile perturbée. Elle s'est penchée plus tard sur la propagation des ondes à partir d'obstacles à l'intérieur d'une région de Dirichlet à conditions limites. Elle a montré, utilisant des identités inusitées sur l'énergie, les premiers résultats sur la décomposition exponentielle de l'énergie locale sur l'extérieur de corps en formes d'étoile. Elle constitue une rareté parmi les mathématiciens car ses opinions, conseils et jugements sont largement recherchés parmi les grands cercles de la société au dehors des mathématiques.