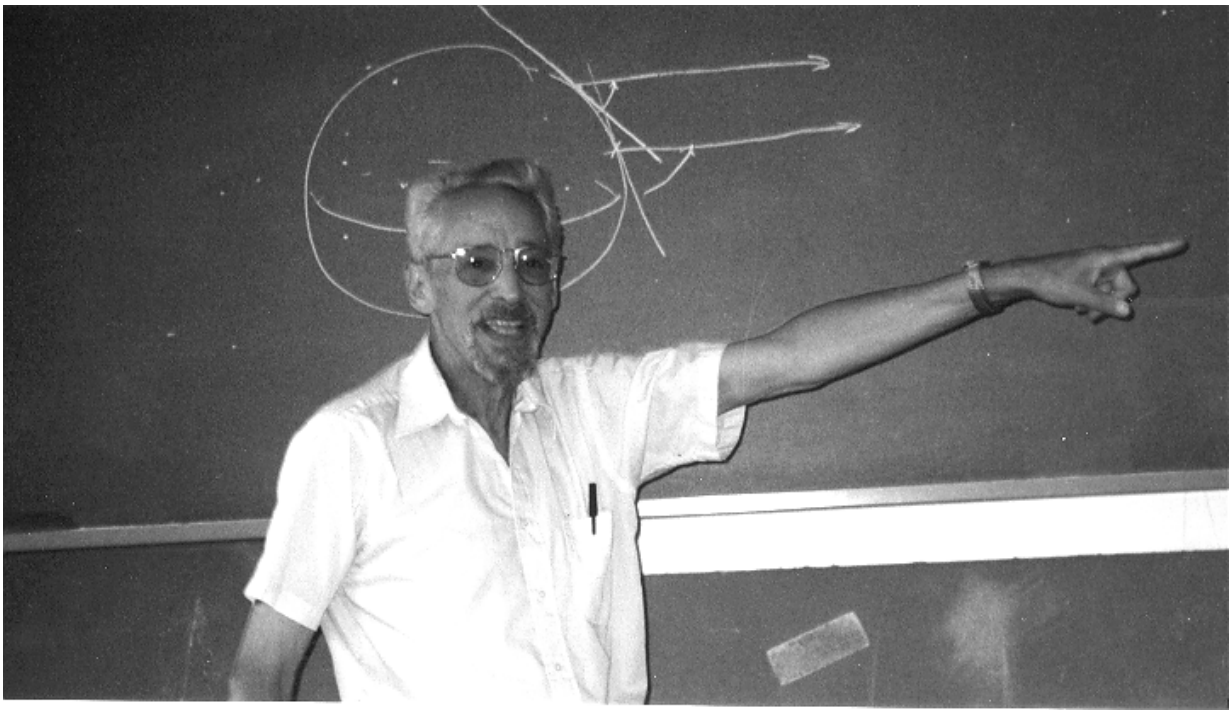
Robert Osserman wrote his PhD thesis under 1936 Fields Medalist Lars V. Ahlfors on Riemann surfaces at Harvard University. Although is name is immediately associated to minimal surfaces he has contributed to a variety of other mathematical areas: Differential Geometry, Isoperimetric Inequalities, Partial Differential Equations and Ergodic Theory. He joined Stanford University in 1955 where he spent most of his career. In 1990 he became Deputy Director at MSRI and is currently Special Projects Director.

Professor Osserman is also the successful author of "Poetry of the Universe – A Mathematical Exploration of the Cosmos", a book meant for the general public.



We know that you are a distinguished mathematician but apart from that we must confess that we know very little about you.

Shall we start with your mathematical upbringing? Where did you go to school? Which universities did you attend?

'I was very lucky with schools. I grew up in New York City which had some wonderful public high schools, and just at the time I was ready to think about where to go they started two new ones – the first specialty high schools. One was the High School of Music and Art, the other was the Bronx High School of Science. Both of them were free public high schools, but they required an examination to get in and admission was on a competitive basis. I was a member of the first full graduating class of the Bronx High School of Science and I had some wonderful teachers, as well as terrific fellow students. One of my classmates (who happened coincidentally to live in the same apartment house in Manhattan that I did) was Richard Kadison, who became a well-known mathematician and was just elected to the National Academy of Sciences this year (1997). Others became famous in physics and the other sciences.

For college I went to New York University and for graduate school to Harvard. I also spent two years abroad during my graduate studies – one at Zurich and one in Paris.'

You wrote your Ph D thesis, on Riemann surfaces, under Lars V. Ahlfors.

What was it like to be a research student of a Fields Medal winner?

'The fact that Ahlfors was a Fields Medalist was certainly known to the graduate students, but it was not a big issue. Partly, I guess, because there were other brilliant mathematicians on the faculty, such as Zariski and Gleason – neither of whom ever won a Fields Medal – and partly, perhaps, because Ahlfors' field – one complex variable theory – was much less fashionable than some others, like Banach algebras, which Mackey worked on.'

When a friend of ours heard that you were to give a

talk in Coimbra he asked *"Does he not work on minimal surfaces?"* It is probably not fair to associate your name just with minimal surfaces.

What other geometrical topics attracted your attention during your career?

'It is true that my best-known results have been on minimal surfaces, and also my book, *"A Survey of Minimal Surfaces"*, has associated me with the subject in many people's minds. Another area I have worked in is that of isoperimetric inequalities; a number of my results are given in the book of Burago and Zalgaller and a survey article I wrote for the Bulletin of the American Mathematical Society became a standard reference for certain parts of the subject; also an article on Bonnesen-style isoperimetric inequalities for the American Mathematical Monthly which received a Lester Ford award. My thesis work with Ahlfors was on geometric function theory and Riemann surfaces, which is a topic I have returned to over the years, especially in relation to differential geometry, as in the recent work I have done on the Schwarz-Pick-Ahlfors Lemma that I will be talking about at the meeting in Braga later this week. Finally, after spending a sabbatical year at MSRI in 1983-84 during a special year on ergodic theory I became interested in that subject; I proved a couple of theorems and had two Ph D students work on related questions. It also led me to a conjecture in Riemannian geometry which has received increasing attention.'

A few years back, 1995 to be precise, a translation of your book *"Poetry of the Universe – A mathematical exploration of the cosmos"* was published in Portugal.

Have you written other books on the popularisation of mathematics? Do you see it as a duty of the working mathematician to make his work accessible to the general public?

'I have written a number of survey articles, one of which became my book on minimal surfaces; they were directed at a broad range of mathematicians, but there were no other books on the popularization of mathematics. I do not see it as the duty of working mathematicians to write such books, and in fact it would be a big mistake for some of them to do it, because they can be making important contributions to mathematics and they may have neither the gift nor the interest in exposition. In each generation there have been mathematicians with the urge to do it, and some quite successfully. For example, in the nineteenth century, there was Clifford, who was the first to popularize Riemann's notion of curved space, and early in this century two books which influenced me greatly when I was a young teenager: *"Mathematics and the Imagination"* by Kasner and Newman and *"What is Mathematics?"* by Courant and Robbins. I do think it is important that somebody do it, but it is very difficult to do well and I do not recommend that anyone try who is not strongly motivated to do it.'

In *"Poetry of the Universe"* you quote David Hilbert, on hearing that a student had given up mathematics, as saying *"Well, he did not have enough imagination to be a mathematician."*

What do you think it takes to make a mathematician?

'I think that many people – including many mathematicians – have much too narrow and monolithic a notion of what constitutes mathematical ability. Some mathematicians, like Riemann and Thurston, have amazing geometrical vision and imagination. Their most important contributions may be new ways of looking at things and new directions to pursue. Others, such as Yau and Wiles, have enormous technical skills, and are able to solve problems and conjectures that nobody else can. Some are particularly good at computations, others at inventing ingenious arguments, some have encyclopedic knowledge of their areas, others read very little of earlier work but strike out in their own directions. The one quality I have never seen absent in a successful mathematician is the willingness to work hard.'

You are now at **MSRI**.

Could you give us some idea of the importance of that institution for American mathematics these days?

'MSRI serves many different functions. One of the most important is the large number of postdoctoral fellows who come each year. There are always at least six associated with each program and they have the opportunity at an early point in their career to meet many of the leading people in their subject, to learn of the newest results and the ideas that are being pursued. Conversely, the more established people in the field get to know some of the best newcomers, and they get time to work on problems, both old and new. Often new collaborations develop.

There are also workshops associated with each of the programs where much larger numbers of mathematicians can come for shorter periods and have intensive exposure and interaction around some particular aspect of the subject.

Besides the regular programs there are a number of visitors each year who have the opportunity to do research in whatever direction. I am not sure how typical my own experience was, where I became involved in a program that I initially had no connection with and continued working in that area for a while.

Under Thurston's leadership, MSRI has also moved in other directions, toward contact with high school teachers, and public events, such as the very successful "Fermat Fest" after Wiles' proof was announced, and the subsequent videotape that sold several thousand copies (and is still selling). We are currently involved in experimental efforts to make MSRI much more widely available using the latest advances in computer technology, including the "MBone" and other even newer methods. We have been encouraging lecturers to give us their notes and transparencies to put up on our web pages, and that has become one of the most frequently visited parts of our website, available to everyone. Also, our electronic distribution of preprints has reached large numbers of people.'