Chapter 1
Massimo Capaccioli: A Life for Astronomy

G. Longo and The Organizing Committee

1.1 The Early Years

Massimo Capaccioli was born in 1944 in Castel del Piano, a small village in the "Maremma", a region in the heart of Tuscany. At the age of eight he moved to Mestre, near Venice, maintaining however a deep affection for his roots, often defining himself as a "maremmano". In Mestre he attended schools and in 1964 obtained the diploma at the Scientific Lyceum Giovan Battista Benedetti. He remained in Mestre other three years, commuting every day to Padua to follow the courses of the Laurea in Physics. In 1967 his parents moved to Trieste and he decided to live in Padua, which would become his home for the next 25 years. There, in 1969, he graduated in Physics discussing a thesis on the Hubble law under the supervision of Leonida Rosino and Francesco Bertola with whom he also published his first paper [1]. The same year he was appointed assistant professor in astronomy at the University of Padua, a position he maintained until 1976 when he was promoted adjunct professor of celestial mechanics. From 1972 to 1976, he also thought Mechanics and Cosmology at the University of Lecce, and General Physics and Introductory Analysis at the Faculty of Architecture of the University of Venice. These were years of intense scientific and academic work during which Massimo built a rich network of international collaborations. First among all, his long lasting collaboration with Gérard Henr de Vaucouleurs, among the fathers of modern observational cosmology who at the time was professor of Astronomy at the University of Texas in Austin. Capaccioli visited Austin several times and in 1985 was also appointed visiting professor. Quickly moving up in the academic career, Capaccioli became first associate professor (1980) then, in 1986, Director of Research at the Astronomical Observatory of Padua, a non-academic

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position which he held until 1990, when he was finally appointed full professor of celestial mechanics at the University of Padua. In the meanwhile, however, the scientific and personal baricenter of his life was slowly shifting to Naples where in 1992 Capaccioli was appointed Director of the Astronomical Observatory of Capodimonte. A professional and personal transition which became definitive in 1995, when he was called to cover the chair of astronomy at the University Federico II in Napoli.

During his Padova years, Massimo published some of his most significant contributions to astronomy. First of all, in a seminal series of papers, he pioneered the field of galaxy photometry and kinematics, paying special attention to the properties of early type galaxies (see for instance [2–4]). His most striking discovery took place in 1975 when, in collaboration with Francesco Bertola, he demonstrated that, against all current beliefs, elliptical galaxies were not flattened by rotation [5]. A result immediately explained by James Binney in terms of an anisotropy of the velocity dispersion tensor. This discovery was labeled as a "Copernican Revolution" in the field of elliptical galaxies by Beatrice Tinsley, and triggered a whole new field of research which is still very active. Most of his work on the kinematical properties of galaxies was driven by a deep interest in the properties of dark matter. An interest which Massimo still cultivates. Other significant contributions regarded the calibration of the cosmic distance scale [cf. 6, 7], the discovery of flaring stellar disks in edge on lenticulars [8]. In 1978 he also was among the first [9] to use the International Ultraviolet Explorer (IUE) to study the ultraviolet emission from galaxies. A line of research which eventually led to the discovery of the so called Ultraviolet Rising Branch: a sharp rise of the spectral energy distribution in the far ultraviolet which was completely unexpected for early type galaxies [10].

In the Padua years, another thread of his scientific activity regarded the study of the collective properties of early type galaxies [11–13] which led to the discovery that there exist two families of ellipticals separated by a well defined cutoff in absolute magnitude and effective radius . Last but not least, in collaboration with his former student Giampaolo Piotto, Massimo obtained significant results on the properties of globular clusters [cf. 14, 15]. It is worth stressing that most of these works were made in collaboration with his students, who nowadays hold permanent and prestigious positions in many institutes around the world.

1.2 The Napoli Years

Massimo Capaccioli's years in Naples have been difficult and full of events. When the Astronomical Research Council (CRA) appointed him as director of the local observatory, the situation he found was far from optimal. In spite of its historical and beautiful infrastructures, the Observatory of Capodimonte had little scientific momentum and was far from the main stream of Italian and international research. Funds were scarce, and the few staff researchers were scattered in too many research lines. Furthermore, the astrophysics group at the University Federico II was small

and, due to a series of events which would be too long to recapitulate, it had little if any interaction with the astronomers at the Observatory. Last but not least, Capaccioli inherited from the previous director Mario Rigutti, the task of completing the construction of the observing station in Castelgrande built around a telescope of only 1.5 m of diameter; a telescope which already at its inception was far from the mainstream of national research. Making a long and troublesome story short, I shall just mention some of the problems that Massimo faced. His arrival in Naples had coincided with the well-known "Mani Pulite" (clean hands) investigation, that in a few years, would decapitate the Italian political class. In those years of turmoil, the fear of being prosecuted paralyzed the public administration, making almost impossible to spend public money. In spite of this unfriendly atmosphere and of many other difficulties, among which also the bankruptcy of the first company in charge of the construction, Massimo and the administrative council of the Observatory took several non trivial administrative risks but in 2001 they succeeded in completing both the telescope and the observing station. But let us return to what was happening at the Observatory in Naples. The beginning was slow and, while gaining visibility in the academic and social life of his new town, Capaccioli steadily guided the Observatory out of the hole. In those years he was appointed member of the scientific council of the Italian Institute of Physical Studies establishing a long lasting friendship with its founder and president Gerardo Marotta. Marotta helped Massimo in connecting to the local and national authorities and in obtaining the first grants which were needed to modernize the observatory. He also became a consultant for the science park "Città della Scienza" for which he cured the first astronomical exhibits, and a member of the "Accademia Pontaniana" (the oldest scientific academy in the world) and of the National Society for Science Letters and Arts of which he was also elected general president for the period 2000–2002. Both academies were hosted in a magnificent but quite disrupted building which Massimo was capable to refurbish by obtaining a 1.8 million euro grant.

After moving to the University of Naples in 1995, in order to modernize the curricula and to increase the number of researchers, Massimo obtained a perpetual grant from the Italian Ministry for University Research Science and Technology (MURST) aimed at funding new permanent positions (at all levels) for astrophysics. Due to the increased personnel and to the improving relationship with the astronomers at the OAC, in 2005, the University Federico II started a new master course in Astrophysics and Space Sciences which, in spite of the initial success, was closed after only four years due to an unexpected and myopic reform of the University. In the meanwhile, after obtaining funds from the new National Consortium for Astronomy and Astrophysics (CNAA) and from the Local Government, he started an intense program of external activities which included, among the others, the refurbishing of the Museum of Astronomical Instruments, a program of Senior Visiting Scientists, as well as a series of public outreach initiatives and events. In order to modernize the Observatory, Capaccioli used his scientific prestige to introduce the observatory staff in several international project and to start new ones. To list just a few: the construction of the wide field imager for the 2.2 m ESO telescope, the design and construction of the VIMOS

spectrograph for VLT, the Planetary Nebulae Spectrograph to be installed at the William Herschel Telescope in Canary Islands. Last but not least the VLT Survey Telescope or VST, which will be discussed in the final paragraph. In the meanwhile Capaccioli succeeded in convincing first the CNAA and then the new National Institute for Astrophysics (INAF, established in 2002), to potentiate the scientific staff of the observatory which, in less than 15 years, raised from 7 to 32 permanent members and saw more than 70 people employed on temporary positions. Most of these young collaborators were selected among his former students, but he also tried to incentivate other Italian and foreign capable researchers to move to Naples in order to improve and internationalize the scientific environment . In the meanwhile Capaccioli continued his intense scientific activity and without even trying to summarise it, I shall just mention his contributions to the study of dark matter in early type galaxies using planetary nebulae as kinematical tracers [cf. 16–19], and to the properties of early type galaxies [20, 21].

1.3 The VST Project

In 1995 Capaccioli had obtained two large grants totaling about 18 million euro. Instead of dispersing it in a myriad of minor projects, Capaccioli decided to invest the bulk of the grants in the construction of a modern wide field telescope devoted only to survey work. This decision was formalized in the fall of 1996 with the start of the VST project. The year after, a scientific committee chaired by G.P. Vettolani was appointed to prepare a report on the scientific value of the proposed telescope and to start the interaction with ESO. The project was officially presented in 1998 and had its formal green light in October 1998 when ESO and the Observatory of Capodimonte signed a Memorandum of Understanding (MOU). According to the MOU the OAC committed to the construction of the telescope and ESO to build the in situ infrastructures and to sustain the operational costs for a ten years period. In order to understand how brave was this decision it is worth to quote a few lines from the speech given by Capaccioli in 1998, at the official presentation of the project.

> We are a small Observatory, if compared to the 'giants' of Italian astronomy, all located in the Northern part of the Country. We are placed in a splendid corner of the world, full of history beauty and intelligence, but heavily penalized by a dark past and a difficult present. In the last few years both locally and centrally it has been understood that one of the instruments for the rescue of Naples and of the whole of Southern Italy is 'culture'. This has been the rationale leading to the allocation of a significant amount of special funds to our Observatory, mainly by the Ministry of Education and Research. Suddenly we became a small institute with a lot of money: a welcome fortune, but extremely difficult to invest effectively in view of its 'una tantum' nature, of the bureaucratic boundary conditions and lack of manpower and traditions.

Indeed, the construction of the VST proved to be a complex and arduous task. In 1999 the design was completed, and already the next year construction begun. In 2000 the call for tenders for the construction of the primary and secondary

mirrors was won by the Russian Lytkarino Optiks (LZOS) which delivered the first mirrors in 2002. These mirrors were shipped by boat to Chile but, unfortunately and for reasons that are still largely unknown, during a stopover in a South American harbor, they were destroyed. ESO, who was in charge of the shipping, took full responsibility of the accident and a second set of mirrors was immediately ordered. Due to some problems related to the reorganization of LZOS, the new mirrors – both of excellent quality-reached Paranal only in 2007. In the meanwhile all the mechanical and electronic subsystems had been realized and as early as 2002, the assembly of the telescope had begun in the Mecsud Factory of Scafati, a small town South of Napoli. In parallel, Massimo also launched an international collaboration finalized to the construction of OMEGACAM, at the time the largest CCD camera ever produced (298 Mpix). The camera was completed in 2006. In 2005 and in spite of the enormous progress made by the observatory, with an unjustifiable political decision, INAF decided to change the OAC director and Capaccioli was appointed director of the newly established VST-Center. This unwise decision not only slowed down, almost to a stop, the growth of the local astronomical community, but also created non trivial problems during the final delicate phases of the VST construction. However, in spite of many problems related to a sudden shortage of funds and to some delays in the completion of the infrastructures as well to some engineering problems which required a partial revision of the original design, Massimo struggled to complete the telescope and the VST saw its first light on the 8-th of June 2011. Already the first images proved that the telescope and the camera had excellent imaging capabilities, well beyond the expectations. The VST was offered to the community early in 2012 [22] and is currently engaged in a large number of outstanding surveys such as the Kilo Degree Survey (KiDS) [23], VST Early Type Galaxies Survey [VEGAS 24], VOICE [25], to quote just a few. I shall stop my short biography here but, in closing, I wish to emphasize that Massimo has left a profound mark in the history of Neapolitan astronomy. Under his guidance the Observatory of Capodimonte and the University have entered a new era and gained international reputation. Furthermore, he has formed a new generation of young and motivated scientists, who are currently active not only in Naples but also in prestigious institutes all over the world.
His legacy will last forever.

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