

**THE IMPACT OF NEW TECHNOLOGIES ON THEATRE & COSTUME****\*Mika Panagou, Nikos Kamtsis and Sofia Gourgoulianni**

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**Abstract**

To begin with, since our project concerns the presentation and the dissemination to a wider public of costumes via technological means we intend this paper to be a recording of the link between costume, stage design and technology. We will trace the theatrical innovations concerning stage and costume design triggered by the new technologies, but also by ideas which shaped new social perceptions. We will begin by referring to artists regarded as pioneers at their time who used new technologies and ideologies to change the notion of the theatre at their time. We will mostly concentrate on theatre directors and stage designers who were active at the turn of the 20th century when the technology of electrical lightning completely revolutionized everyday life triggering, also, various artistic innovations. We will then pass on to digital revolution in recent years arguing that internet has, also, been a technology which has completely changed lives in the whole world and has recently been utilized in theatrical performances. Moreover, as the pandemic has altered our perspective about the co-presence of actors and public, the digital space has become an even more welcoming theatrical "stage". By studying these different artists and performances we will argue that theatre is and always will be a mirror of human activity and an indispensable part of its history. In addition, as costume always participates in the theatrical act, we will ascertain that there have not been made essential efforts for it to be preserved and disseminated through technology to wide audiences. Technology seems to be used for live performances, which reach out to already existing audiences. Whereas, our project's aim is to widespread the importance of theatrical costumes to new younger audiences, either for educational or artistic projects.

**Keywords:** Virtual reality, Theatre costume, Costume design, Augmented reality, Theatre pioneers, Stage design.

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**INTRODUCTION**

This paper is part of a project by the General Secretariat of Research and Innovation in Greece. More specifically the project is part of the thematic unit concerning Development of innovative applications for the revival, representation and dissemination of intangible cultural heritage combining popular urban tradition as expressed through urban clothing and the activities for which it is used and contemporary culture as expressed by the theatrical representation and use of clothing through modern audio, video, and video technologies and augmented reality. The project will offer a set of innovative applications that will highlight the urban clothing and its uses in everyday life as reflected in theatrical act. More specifically, its objectives are: (a) the promotion of a great cultural asset (b) the emergence of a collection of costumes of decades and their historical rescue, (c) the research and its results in the field of coupling IT products with the field of creation and art, (d) the creation of a work emblematic for the theater space, (e) the creation a tool for clothing professionals. As we have already noted, the subject of this particular paper concerns the combination of new technologies with costume and theatre. As theatre in order to achieve its different visions of each period has always used technological means we will begin by presenting a short history of the use of these means. Moreover, we will emphasize on the contemporary technological revolution and the unknown future it holds for us. To continue with, we will refer to a number of important stage designers and directors who throughout the years envisaged a "new" form of theatre and who in order to achieve it became artistic pioneers using new technologies and aesthetics available at their time.

Moreover, based on the technology of the time of each artist, we will try to combine the evolution of costumes with the evolution of technology. More precisely, we will focus, mainly, on the innovations which occurred at the turn of the last two centuries, electrical lightning and the vast use of the Internet. Consequently, most of the performances and the artists we will refer to belong to these two different times and were preoccupied with the use of the new technologies available. We will prove this way that theatre is an indispensable part of human life and its different evolutions, which is always both affected and mirrored on the stage. As far as costumes are concerned, by undoubtedly being a part of staging theatre plays, they are also closely linked to the evolutions in everyday life. The first set of artists we will study derive from different times and mostly from the turn of the 20<sup>th</sup> century, apart from the first case study which is Inigo Jones, an artistic pioneer of the Renaissance theatre. We should, at this point, note that these artists combined various disciplines both concerning the theatrical act and their academic qualifications. Therefore, they were involved in all the aspects of staging a play, as directors, stage designers and costume designers. In addition, some of them were also trained as architects. We, therefore, observe that at this time of technological revolutions theatre needed this combination of disciplines. Moreover, nowadays, as we will ascertain, the use of technological applications also requires a relevant combination. By concluding that both these periods required theatre to co-operate with other disciplines which were and are at the verge of new ideas and technologies we understand that it is and will always be a mirror of human activity and of the contemporary application of its various revolutions and alterations. The main subject of this paper being the application of technology in the evolution of the theatrical costume and the theatrical act in general, it passes through various historical periods proving that the history of theatre is inextricably linked to the history of

technology. Its main aim is to link these two fields by giving specific answers to readers concerning both the past relationship of technology with theatre, but, also to prove that this relationship will continue to exist and flourish in the future. Moreover, in this paper, the specific innovations of our project are analyzed. These innovations are implemented in relation to this combination of the two fields and more specifically in the field of theatrical costume by presenting a new way of disseminating theatrical costume. This way, readers will be able to fully comprehend and establish the link between theatre and technology and, also, understand essential details about our project and the innovative way it approaches costumes. As far as the structure of the paper is concerned, the first chapter deals with the present and past relationship of the theatrical director with technology and the challenges for this relationship in the future, occurring from the rapid evolution of technology. The second chapter concerns theatrical pioneers through history who used the technology of their time to evolve theatrical act and theatrical stage design and costumes. The third chapter introduces the perspective of current technology and its impact to the theatrical act. In this chapter, therefore, we deal with the impact of the digital revolution on the creation of innovative costumes and theatrical performances. Finally, in this chapter, apart from referring to other contemporary projects which combined the two fields, we analyze the special and concrete contribution of our project. In the fourth and last chapter, we present an analysis of the exact technological applications our project has resulted to in order to establish exactly our way of approaching the field and our specific innovation.

## THE UNBEARABLE LIGHTNESS OF TECHNOLOGY

### The terror of the theatre director facing technology

Since the time of the "Deus ex machina" and the ekkyklema we have, certainly, come a long way. Although we do not forget the contribution of the ancient Greek tragedy and the universal changes and values that it introduced to what still exists today and is called theatre, we can only stand with respect to myriad other achievements of technology. Engineering, electricity, acoustics and electronics, over the centuries have made the lives of the people of the theatre easier and have hugely contributed to giving an essence of reality to the theatrical illusion. We have, indeed, advanced in so many ways, that the illusion is confused with reality on stage more than a few times. Indeed, the periaktoi, the ekkyklema and the theoxoetra are the stage ancestors of the modern digital media available for the people of the theatre, such as Aeschylus, Sophocles, Euripides and Aristophanes are the ancestors of Shakespeare, Moliere, Lorca, Brecht, Ibsen and Chekhov. Of course, the most important position of these machines employed in ancient times (in terms of publicity) is held by the "Deus ex machina". And just as the "Deus ex machina" came down with a rotating wooden crane and pulleys from above and gave solutions to events on stage when tragic poets could not solve the plot, in the same sense, technology gives admirable solutions to theatre directors for the realization of their vision and for the sake of the spectators. This was exactly the "Deus ex machina". A lifting machine (crane) used for the descent to the stage of important characters for the action of the play (eg heroes, gods) or heavier loads. It consisted of a long articulated beam supported by a rotating vertical beam. The load was lifted with a rope through a pulley and a manual winch. A counterweight to balance the suspended load made it

easy to handle by the machine operator. The machine was mounted behind the stage near the left parodos in an almost horizontal position. At an exact moment of each show the machine operator, after balancing the load with counterweights, gave the required inclination and then the required rotation to the beam so that the load was above the middle of the proscenium. A wheel at the end of the beam may have made it easier for the operator to rotate it in order to place the load to the proscenium with the help of the winch. Periaktos was the ancestor of modern rotating settings. It was a rotating prismatic construction which in its three vertical seats had painted representations related to the plot of the play, offering to the performance different combinations of scenes. There were two periaktoi in the ancient theatre, located to the right and left of the main door of the palace or the temple. By changing, they gave the show the opportunity to differentiate the setting many times with various combinations. The ekkyklema and the exoetra: the first was a low wheeled vehicle for transporting the dead, objects, etc. on the stage and the second a low rotating (around an axis) semicircular floor for the rapid appearance and change of the interior scene, a precursor of modern rotating scenes on wagons.

### The yesterday that is moving away

From the time when Euripides, locked in a cave, wrote Medea and Bacchae, we are separated by centuries. As the time passed, the theatre director invented visions with his imagination, which required new mechanisms in order to be realized. Eager engineers and inventors rushed to satisfy his vision, inventing incredible machines and taking advantage of the achievements of scientists. Universal changes took place on the theatrical scene when electricity was discovered. The candles that were placed around the stage to illuminate Moliere and his theatre company and which caused the melt-down of the thick make-up from the heat, were replaced first by acetylene lamps and then by incandescent light bulbs. At this exact point there was a revolution, the imagination run riot. The theatre director could light the scene from above and approach the sense of daylight. Then, specially shaped metal cylindrical boxes were invented to place the lamps, so that their light did not diffuse everywhere, but only from the front, where the metal frame left a circular opening. The optician scientists were then involved and provided the manufacturers with special lenses that went in front of the circular aperture and directed the light in a more concentrated way where the theatre director desired and compelled it to go. Colored filters were inserted in front of the lens to change the color of the lighting and capture the warm light of the sunset or the cold blue light of the morning or night. By moving the lamp back and forth inside the metal frame with a screw, the distance between the lens changed and the beam of light became narrower or more diffused. This result became more accurate with the combination of more lenses and "knives" inside the projector that cut the beam and strictly illuminated the frame that the theatre director wanted while the rest was left in the dark. The science of theatrical lighting is huge. I consciously use the term science. Because it is a science. From incandescent bulbs to today's robotics and moving heads, all converge in the realization of the visions of the theatre directors and the loading of the theatrical scene and action with drama, romance, poetry. Another science is acoustics and the whole behavior of sound. Amplifiers, microphones and speakers are at the service of the show to make the actor's voice reach and cover large crowds of spectators. Moreover,

there exist compressors and filters that improve the vocal result especially in opera and concerts. Engineering gave the theatre the almost immediate and diverse alternation of settings. Rotating scenes and wagons for example make the actors appear from the bowels of the theatres. In addition, the settings, no matter how massive, can be easily changed, representing seas, mountains, ships, giants and monsters.

### **The unknown today**

Today is even more impressive. While, as mentioned, theatre has been using all kinds of effects from lighting to sound - for hundreds of years to make the experience more engaging to the audience, innovative new technologies offer a unique way to add an extra dimension to performances. The theatre industry is experimenting with exciting technologies, including Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) (virtual reality, augmented reality and augmented reality respectively) to see how these new media can turn the art form in new, unprecedented directions.

It would be wrong for the reader to form the opinion that technology came unilaterally to serve the respective vision of the theatre director. The relationship is reciprocal. The direction in turn was adapted to and collaborated with technology, bringing new elements to the psychology, the movement, the voice, the sound and to every element transmitted from the stage to the audience. Where previously the sound of a storm was made with a large sheet that was shaken violently, all of a sudden there was the tape recorder that presented the storm with recorded natural sounds. The same happened with the wind, the rain etc. , but also with the music. That is, while before the relative technological innovations, a fairly large orchestra with natural instruments had to be inside the proscenium and at a depth of about 1.5 meters, with the tape recorder and its evolution (cassette, cd and finally computer with the appropriate software) the orchestra was repealed and replaced with bulky speakers and amplifiers. But the performing arts are not all about theatre and dance. There is not just the theatrical scene that forces the viewer to watch by developing a frontal relationship with the dancers and actors. There is, also, cinema and television. And the natural habitat of these arts is the studios and the natural landscapes. Lighting and sound had, consequently, to also be of use in film, and then in video and in editing. And we come to our wonderful contemporary world which, with digital technology, has turned upside down. If in the past we had a technological revolution every about 30 years now we have almost every day. The theatre director's skills must be enormous and he must have knowledge of many other things and not only the actor's function on stage. If previously we had one or more conventional cameras, which left the viewer depending in the frontal relationship in the two dimensions of any screen (cinema or television), now there are 360 cameras that scan everything in all dimensions (rear front, right, left up and down). If previously the theatre director had to organize the action on stage in order for the viewer to watch, now what should he do when the viewer (the camera) is in the middle of the stage and the actors move and talk from everywhere?

Yes, the theatre director left the straight lines and moves for the sake of the circular moves.

The actors will now move around the viewer (the 360° camera) and will tolerate another active person on stage with

many demands. Because now he not only sees them from everywhere, without the actors being able to hide from him, but he can even engage in personal actions by choosing who he will watch. The protagonist who took the lion's share of the viewer's attention and interest comes down from his throne, because he may speak and suffer, but the viewer chooses to look elsewhere. Hamlet may say his famous monologue, but the viewer is free to look back at the castles of Denmark listening to the metallic sound of the humble guard coming and going in armor, wearing helmets and holding a javelin. In this case, the question "to be or not to be" takes on an extra existential significance not only for Hamlet but also for the actor who plays him.

### **And the creation... where to with the creation?**

Theatre has always used technology, but what we have now is a whole new wave of technology that brings with it the potential for new types of theatre and storytelling in general. And that entails all the factors and their function. Writers think and imagine in 360 and the theatre directors, set designers, costume designers, light designers etc work with a story board. It is fascinating to see writers, theatre directors and designers working with creative technologists and getting excited as they explore new ways to bring the art of storytelling to the public.

### **The public? the eternally unknown**

And the public? If all these technologies work in the present but also foreshadow the future, then to what audience are they intended? What is the "Audience of the Future"? What does he expect and how is he entertained? How lively can the show be (show: meaning I pretend to be but I am not)

Through digital innovation in the arts, how far can new roads be reached in which the public can experience live performance using new and emerging technologies? The visual arts are evolving as technology evolves, and there are more and more opportunities for artists to experiment with bringing this technology to the audience throughout the world. This audience will show what can be achieved. What will remain and what will disappear, what will evolve even more and what will remain stagnant, what will disappear and what will be integrated into the already existing experience of centuries. This audience more unknown and unpredictable than ever, is not measured and determined by known indicators by age or location. Now, the criteria and indicators of measurement are universal and include people and whole generations. To conclude, an audience alienated from technology, art and creation is not something that artists universally desire for. We are in the middle of the road. A journey that probably has no end. Artists and creative technologists work in various fields and every "crazy" project is for the moment projected on computer screens. However, the time when it will go out and meet the general public who has never seen anything like it is not far away and it is extremely exciting. A little research on the ubiquitous internet with its limitless possibilities is enough to impress us. The famous Royal Shakespeare Company for example, in 2016 in Shakespeare's "The Tempest" using Intel technology, presented Prospero's elf, Ariel, as a digital idol, live and in real time. Actor Mark Quartley wore a costume with motion sensors, making Ariel's "avatar" appear in the most unpredictable parts of the sphere theatre and the audience was impressed with his flights from one side to the other. The Imaginarium Studios and Intel with their technology and

know-how gave a special and solemn glamour on the 400th anniversary of the death of the great poet. The ARShow, an augmented reality platform in Tel Aviv allows the public to experience augmented reality using an operating system that can be synchronized with an unlimited number of devices / users, offering a unique collective experience. The Gulesver application at the Geshen Theatre is a children's game that instructs the audience to wear Merge headphones and with the help of the smartphone to enjoy the augmented reality experience, even in live streaming. "Cosmos Within Us" is a VR experiment. The participants enter the mind of Aiken, a 60-year-old man with Alzheimer's, who is desperately trying to keep his childhood memories. With the intervention of musicians and singers, the participants help Aiken to realize different sounds and to overcome his problem and illness. The "Under Presents" project first launched at the Sundance Festival in 2017, and is now available at Oculus Quest for anyone wanting to try it out. If he does, he must be ready for something unique: Live theatre is present and real actors confront their spectators, lead them on stage for interactive activities and impose penalties in case of misconduct by placing the players / spectators in a cage.

### **Epilogue with a smile (full of meaning)**

The list of the operation of the systems and the new experiences they offer is large and impressive. The future holds great promise. What they cannot promise, however, is the poetry that exists in the living body of the actor, in front of the living entity and the gaze of the viewer. The actor and the viewer both of them live together the same creative experience in the present time employing their imagination, mental and cultural horizon and sensitivity. If Genet raised the actor to the height of the saint, in front of whom we stood in awe as he suffered creatively on a wooden theatrical loft, now in the labyrinthine and chaotic circuits of computers, we are desperately searching for a remnant of the holiness of the theatrical experience. The theatre has always been and is the place of an absolute democracy. Platforms, masks and innovative software will take many years to conquer it.

### **THEATRICAL PIONEERS AND THEIR CONTRIBUTION TO THE CREATION OF INNOVATIVE COSTUMES AND STAGE DESIGN**

Throughout history, there have been various theatre artists preoccupied with the use of technology in the practice of their art. More specifically, by appropriating innovative new technological means they resulted in evolving the image and nature of theatre. In this chapter, we chose to refer in detail to specific theatrical pioneers. The choice of these pioneers was based on the one side on the transformation of theatre from a court happening for high society to a true social art and on the other side to the introduction of electrical lightning. So, up to the 16th century in many European countries theatre was not yet exactly regarded as an art concerning the whole of society but as concerning essentially the court. Inigo Jones was chosen as he was the one who truly put forward its artistic perspective. Furthermore, as electrical lightning truly revolutionized every aspect of human life, theater artists of the time, as Adolphe Appia and Edward Gordon Craig, utilized lightning and their own artistic vision to reform theatre, stage design and costumes. Finally, moved by the belief that theatre is an art inextricably linked to progressiveness and social change, we refer to Isadora Duncan who was one the first artists who established this link. Moreover, apart from linking theatre and

dance to social change and feminism, she combined this link with completely transforming theatrical and dance costumes.

### **Inigo Jones**

Firstly, we will study the case of Inigo Jones. Inigo Jones was an English architect who lived from 1573 to 1652. Inigo Jones, as John Peacock noted, like many Renaissance architects employed at princely courts, combined the functions of architect and stage designer (Peacock 1982). To begin with his contribution to stage design and his use of the technologies of the time, we should note that during the 16<sup>th</sup> and 17<sup>th</sup> century Europe, a form of theatrical happening which took place, mostly concerning and glorifying the high society of the time and the king's and queen's courts was the masques. Inigo Jones was, therefore, one of the most prolific creators of masques in Renaissance Britain and a pioneer of the kind. Jones for his work as an architect travelled to Italy where he had the chance to observe more closely both the architecture and the stage design of this different country. And by combining his two different professions we observe that there is an aesthetic link between his stage designs for the theatre (masques), as a form of "unreal" architecture, and the "real" architecture concerning the creation of buildings and monuments. Moreover, as Peacock observes, he lived in a country where art was still in darkness and, by travelling, he became the first English artist to acquire a deep and inward knowledge of the whole Renaissance tradition (Peacock 1990). Jones, as Keith observes, was stuck in a period when no attempt should have been made to adopt movable scenery in London theatre until half a century after its introduction into England if there was not Inigo Jones (Keith 1914). His big technological contribution was, consequently, the introduction of movable scenery which, was afterwards used in theatrical productions even outside the kind and the field of the masques. In addition, one of Jones's special contribution to the theatrical arts was the introduction of modern Italian perspective scenery (Peacock 1990). More precisely, he introduced the framed proscenium stage which creates an architectural microcosm through which spectators view deepening prospects painted on wings at varying distances (Jordan 1991) Finally, Jones's invention of the machinaversatilis, a sort of revolving globe with no visible axe, lets him display at least two successive scenes of one stage setting; his invention, too, is the scenaductilis, an arrangement of movable shutters set in grooves (Jordan 1991). As far as costumes are concerned, firstly, it has become, already evident that masques did not aim to produce theatre of high artistic quality. They were more of a visual way for the upper class to show their wealth and power to the public (Granville-Barker 1925). However, for each masque new stage, scenery and costumes were made (Uusitalo 2012). Therefore, Jones had the opportunity of unfolding his artistic qualities and vision concerning costumes. According to Uusitalo his basic influences were three. Firstly, he copied symbolic images from Ripa's Iconologia to his designs (Uusitalo 2012). Moreover, for his costume design, he might have followed Bernardo Buontalenti's work in Italy (Uusitalo 2012). He became acquainted to these two sources of influence during his travels and he, therefore, introduced methods in costumes and scenery never before seen on an English stage (Uusitalo 2012). His third innovation on the field of costumes derived basically from his own vision. Unlike other producers of masques of the time, Inigo Jones, collaborated closely with the playwright. Inigo Jones believed that in the masque script the writer or the poet suggests various ideas for the costumes

as well as for the scenery (Uusitalo 2012). He always tried to use the script as his basis, work on it and evolve it in his costume designs. To conclude, even though Inigo Jones was linked to the creation of masques which was a kind of entertainment following contemporary fashion and destined for the court, he succeeded in introducing theatrical elements which later on were used in popular theatre and in the decades following became common knowledge. We chose to refer to Inigo Jones's work as a pioneer of stage design as he was the one who pulled out of its darkness English Theatre. Finally, we identified him as a true visionary of art as he created his personal, concrete artistic language by combining architecture and stage design.

### **Adolphe Appia**

The next artist to whom we will refer is Adolphe Appia. Adolphe Appia was a Swiss architect, stage designer and director who lived from 1862 to 1928. Appia lived and created in a period which was universally marked by the swift to electrical lighting, not only in theatre, but in various aspects of everyday life. Appia, as a true pioneer of his time was preoccupied with this new innovation. However, his innovations sprung through many aspects of the theatrical performance and did not only concern a different use of stage lighting. To begin with, Appia lived in a time when two new sources of light – limelight and the electric carbon arc – began to be employed on the stage (Palmer 2015). In his time, the stage was lit predominantly by gas and the lighting was predominantly employed in achieving sufficient light levels to be able to see the performers and to illuminate the painted settings. (Palmer 2015). After having completed a training in the contemporary methods of lighting, Appia introduced his own contribution which had basically to do with moveable sources of light. The first type of light he used is diffused light, which provides a layer of light to enhance the more suggestive lighting effects, the second type of light was active, which highlighted what it lit, providing the means for enhancing both the external and inner settings as well. (Palmer 2015) As far as the exact use of lightning devices is concerned, he used portable limelights and carbon arc lights in creating defined areas of light and shadow which were portable, handheld and importantly not fixed in position, in contrast to the permanent lighting of the footlights, border lights above the stage and ground rows at stage level. (Palmer 2015). In addition, he introduced new technologies in lightning by not using gas standards or bunch lights, but the newer, much brighter and focusable 'spotlight' lanterns with lenses that offered a quality of light that differed significantly from the more general gas-powered lights (Palmer 2015). Another key innovation was his novel use of light, based on a new electric lighting system. This system, invented by Alexander von Salzmann, for the first time allowed an indirect (and steerable) lighting (Wiens 2010). Appia by using these new technologies of lightning, tried to create an atmosphere based on the contrast between lights and shadows which would transform the static notion of the theatrical performance to a vivid act. The next aspect of the theatre practice which he influenced with his ideas and practical work was the stage and its organization and setting. More precisely, he believed that in order to achieve the musicality and fluidity he opted for, he removed the two-dimensional painted settings and replaced them by three-dimensional ones which would give the feeling of real life. As far as the precise nature of the innovations he used, Appia established a hierarchy with his sets: a three dimensional

setting rather than a flat backdrop as a proper background to display the movement of the living actors. (Payne 2018). Moreover, he theorized that the scenery should be replaced with steps, ramps, platforms, and drapes that blended with the actor's movements and the horizontal floor (Appia 1962). Finally, he advocated for the removal of the proscenium arch and all naturalistic details (Lewis 2007). His third and final reform concerned the nature of acting. In his theory the living and moving human body is considered as its object as well as its instrument and he hoped to create an architectural style which used the living body of the actor as its sole point of departure (Rogers 1967). In order to make actors understand the rhythm and timing he wanted his actors to undergo training in gymnastics to prepare their bodies.

As far as costumes are concerned, by observing specifically Appia's drawings one has the feeling of being in an ancient Greek or Roman temple. Furthermore, he opted for the element of a vivid enactment of everyday life and for a performance which could be viewed as a holistic experience. His costumes used symbolic colors, as the lightning also did, and they were famous for being created by cheap materials. Also, by studying his drawings, the costumes seem to follow a pattern of three dimensions resembling ancient temples. However, they are of a simpler design than Ancient Greek and Roman ones and have no essence of grandiosity, giving the impression of a harmony between his set and the actor's costumes. To conclude, Appia, as a true pioneer, used the electrical lightning, but introduced his own elements by adapting it to his notion and vision about the reform of theatre. Moreover, Appia created a whole new theatre by totally altering stage design and introducing a theory about acting. The fact that his innovations truly revolutionized theatre is certified by the influence his work continues to have to creators through the decades. More precisely, in 1963 Cordell noted that some of these revolutionary theories of half a century ago have passed into conventional theatre practice today: the simplification of setting (a revolt against realistic scenery) to emphasize "the living actor" rather than the dead setting; the use of setting to suggest, rather than to imitate slavishly; the conviction that non-intellectual drama can be intellectually as well as esthetically stimulating; and the skillful use of light to unite all elements of production and reveal the spiritual core of the drama. (Cordell 1963). But, even till today, one can observe Appia's influences in the work of Robert Wilson and in the famous performance "Operation: Orfeo" of the Danish theatrical group "Hotel pro Forma".

### **Edward Gordon Craig**

The third artist to which we will refer is Edward Gordon Craig. Edward Gordon Craig was a British artist who lived from 1872 to 1966 and dealt with almost every aspect of the theatrical production and art throughout his life. Craig, was active some years after Adolphe Appia, at a time when electrical lightning was slowly becoming common and used massively in theatre. His most essential work was implemented in Russia, where he met with Isadora Duncan and Konstantin Stanislavski. In Russia, Craig and Stanislavski decided to collaborate on a new staging of Hamlet. Through many delays Hamlet opened in Moscow Art Theatre in 1911-1912 with the stage design created by Craig. His designs and the whole performance are still considered as one of the most influential performances of the early 20<sup>th</sup> century. As far as the precise innovations of his designs are considered, he used screens made of wood, painted and covered with cloth which would be interchangeable so as

to produce endless combinations of designs and scenes (Flockton 1970). He said that a work of art should be made of inorganic matter such as stone, marble, or bronze, and that these materials should be re-usable as an artistic form (Flockton 1970). As this staging of Hamlet was Craig's most important work where he had the chance to display all of his innovations, we can also observe his concrete views about costume design. Therefore, we can observe the emergence of a non-naturalistic, multi-dimensional costume design—a style Craig called “noble artificiality” (Holt 2017). More precisely, one of the most iconic costumes is Hamlet's tunic (Holt 2017). In addition, there has been preserved one of Craig's black figures for Hamlet with the daemon of death which shows Hamlet wearing a long, narrow tunic similar to the finished costume, although the actual garment's ornamentation is not present in the black figure (Holt 2017). Finally, one of the most famous sketches preserved shows a costume of one of the actors in robes of Thespis. It is probably a messenger boy wearing a mask, carrying some letters, wearing a long robe and sandals with big soles. As we just mentioned the use of the mask in the costumes of Hamlet, we should introduce his most important innovation as far as costumes are regarded which is related to the element of the mask. From the beginning of his artistic career, Craig began to study the history of puppet theatre, to experiment with different kinds of puppets, and to think over their artistic potential. (Plassard 2015). After leaving Moscow and settling in Italy, he had all the time to study his innovative ideas about the use of the mask. He began dismissing the use of actors, as he did not trust their facial expressions which he thought was always just trying to cover a lie and create a theatrical illusion. He did not wish, however, to revive the mask of the ancient Greek theatre; rather, he wanted a mask which would return to the stage to restore expression, the visible expression of the mind, and which would be a creation, not a copy. (Flockton 1970) At this time he totally formed his theories and created a new figure, the uber-marionette. This new figure was supposed to stand as the symbol of man, and he was christened the Uber-Marionette. His chief virtues were those of silence and obedience, and he did not pretend, like the actor, to be something he was not. (Flockton 1970) However, even though Craig by introducing the uber-marionette introduced a truly innovative approach to costume design and stage design, he never explained the exact nature of this element. Consequently, there exists till this day a conflict in theatrical theory about the uber-marionette, as there are scientists and artists who believe that Craig was referring to a human being disguised as a marionette and others who believe that he referred to an oversize marionette made from wood as were the wooden engravings with which he always experimented. Even though he published thoroughly about the uber-marionette he never tried the results of these experiments on stage as to understand their true nature and to verify if their use was practical.

To conclude with, Edward Gordon Craig is still considered one of the most important theatrical pioneers of the 20<sup>th</sup> century. Although Craig's ideas concerning the domination of the director in the theatrical performance were often extreme and did not find practical use, as Newman notes, “the theatre was ready for the director, but his rise can be attributed to Craig's definition, to his uncompromising stand, and to the confidence aroused by his remorseless reiteration” (Newman 1986). He, consequently, influenced personalities as disparate as Granville Barker, Rouch, Pitoeff, Barrault, Leon Schiller, Ordynsky, Meyerhold, Vakhtangov, Komisarjevsky, Hilar, Kozintsev,

Brook, and many others, while indirect influence can be traced in apparently improbable figures like Artaud or Grotowski (Newman 1986). It is, therefore, evident that even though he did not, eventually, have the chance to stage many of his works, he introduced elements which continue to exist and influence theatre artists till today.

### Isadora Duncan

Isadora Duncan was an American dancer who also lived at the turn from the 19<sup>th</sup> to the 20<sup>th</sup> century. She reformed the notion of dance and of the woman's image in it and is still regarded as the “mother” of modern dance. We chose to study her as she was the first to attribute to dance a social context by embracing socialist and feminist ideas. Moreover, and most importantly, she completely changed the style of dance costumes. To begin with, she repeatedly criticized not only the artificiality of the traditional ballet system and its disassociation with the laws of nature, but sought a way to express her views regarding the distorting effects imposed by the ballet costume on the human, in particular female figure (Mihalic 2019). By doubting the forms of traditional ballet, she tried to also address the subjects of the place of woman in modern society and become a part of the feminist movement. Duncan's theories and choreographies emerged within a rich, transatlantic web of influential thinkers and the twentieth-century cultural milieu more broadly. (Simonson 2012). Isadora Duncan was, therefore, an artist who tried via her art to drive to social progress and not only express her personal feelings and questionings. She, consequently, is still regarded as an emblem of freedom and sought to achieve liberation by rejecting the prevailing notions of dance together with the nineteenth-century perceptions regarding the way in which women were expected to lead their lives and construct their sartorial appearances. (Mihalic 2019). In order to achieve this notion of combining social progress with dance her basic idea was that the female body, when performing choreographies, should be liberated. It is obvious that such kinetic celebrations of female vitality required the adoption of garments that challenged the dominant conventions of women's dress and represented a route to alternative practices that encouraged physical and personal freedom (Mihalic 2019). Isadora Duncan, by studying different cultures and their history, found herself getting inspired by the form of woman in ancient Greek art. She believed that the art of ancient Greece expressed the highest standards of universal qualities of beauty and nature and modelled her movements in accordance to Greek imagery (Mihalic 2019). She, consequently, chose transparent, free-flowing tunics based on models adopted from the classical antiquity (Mihalic 2019). In addition, she danced with bare feet, often wearing just chitons and draped dresses. Her image was paralleled to Greek goddesses and most often to Venus. But, there are also similarities with Minoan art as their imagery, which showed provocatively bare-breasted, snake-wielding, red-lipped and kiss-curved females, bears resemblances with the such so-called Snake-goddess and the Minoan wall-painting known as ‘La Parisienne’ (Momigliano 2013). However, we should note that although her approach to dance was often referred to as Greek, Duncan did not strive to reconstruct Greek dances and clearly described her relationship to the discourses of ancient Greece solely as inspirational, highlighting that the references adopted from classical art enabled her to interpret universal and natural gestures (Mihalic 2019). To conclude, even though Duncan did not use any innovative technologies for creating her costumes, she totally revolutionized the way of creating female costumes and of



regarding the female body both in the making of art and everyday life. Isadora Duncan was the first woman who believed that the art of dance can become a means of social progress. And by clearly embracing the ideas of the first wave feminism she succeeded in becoming not just a dancer, but the “prototype of the new, independent woman of the twentieth century”. (Mihalic 2019)

### THE IMPACT OF THE DIGITAL REVOLUTION ON THE CREATION OF INNOVATIVE COSTUMES AND THEATRICAL PERFORMANCES AND THE CONTRIBUTION OF OUR PROJECT

The next part of this paper concerns the current use of contemporary technologies. We have chosen to pass to this contemporary use by recognizing that the vast use of Internet has completely revolutionized our everyday life in a way like the electrical lightning changed it in the turn of the previous century. This digital revolution has altered the way in which every aspect of our life is experienced and, therefore, it has also invaded the arts and their practice. As our project concerns costume and theatrical garment, we will firstly refer to the current use of technologies in costume and theatre as a whole. We will present the different options for their exploitation in theatrical performances and we will refer to particular essential projects. To continue with, we will analyze our project, our aims and our particular innovations. We will conclude by ascertaining that there has not been really made an effort concerning costume as the one being carried out by our project. To begin with, even though theatrical groups have already used the digital space as part or as the whole of their theatrical stage from the beginning of the 20<sup>th</sup> century, the recent pandemic has more than ever exploited this digital space and the various ways of creating and relating to art, by triggering the birth of theatrical performances yet to be tracked and analyzed. In this section we will explore both the ways in which technology is implicated in the creation of theatrical performances but also the way it is used, precisely, in creating costumes for these performances. We will begin by analyzing the way in which new technology can be used in the making, using and disseminating costume. Firstly, we should note that even though relevant technology is available it has not been of vast use in the field of costume design. Currently, there are only such few case studies, most of which focus on healthcare and fitness, where wearable gadgets are more dominant than interactive clothing itself, and a few research projects are related to gaming (Honauer, Hornecker 2015).

In our own project we are interested in the costume as a vivid part of the theatrical history and as one which has to be preserved and projected to new audiences. This has led us to explore the use of technology in order to present it in new digital ways. When trying to identify the use of these new technologies in costume design, outside the field of sports, our first observation is that the basic field using them is fashion. We, therefore, have for example Iris van Herpen’s shows, a collaboration between Victor and Rolf and makeup company Shu Uemura for creating false eyelashes and a partnership between Robert Wilson and Nike to create a series of high-end athlete’s portraits. However, technology, as smart fabrics and wearables, are available and have been used in a small number of performances of dance or theatre. They can be, therefore, attributed to two groups: (1) Intelligent garments such as Joanna Berzowska’s “Memory Rich Clothing” prototypes, which record intimate actions felt on the clothes; or Barbara Layne’s reactive “Jacket Antics,” outerwear that responds to

surface contact or built in programming. (Birringer, Danjoux 2009) (2) Interfacial garments sensing and “actuating” the virtual environment through sensorial embodiment offer greater potential for a relational aesthetics, as performers can affect changes in an audio-visual digital environment or even seek to integrate audience behavior into the reactive functions of the environment, as it was demonstrated by Penelope Wehrli’s camera orfeo and konditionpluriel’s passage, two choreographic installations exhibited at the CYNETart 2008 festival in Dresden/Hellerau (Birringer, Danjoux 2009). As an example, we should note the Telematic Dress, a garment which is created to materialize during live performances. It was created in DAP Lab in Nottingham and tested in various labs in USA, Brazil and Japan. We should, also refer to the project “The Electric Corset and other Future Histories”, a Nottingham Trent University project in collaboration with Nottingham Museums which tried to create wearable garments which could be used and worn in everyday life.

Even though, there exist efforts for these technologies to be integrated in the arts, there are, also, several important issues which impede their vast use. The first and most important is that these technologies are created basically to be practical and they do not invest in integrating any particular concept of aesthetics as artistic creations always do. Moreover, their development requires the co-operation of different disciplines and does not depend only on the knowledge and abilities of the performing artists. These co-operations are not always easily formed, as they require the existence of various financing sources. These financing sources, often, derive from the Academia in order to create research projects and, consequently, the costumes produced are not really used in theatre and remain at the position of research work. We should also note that, there are also several issues as these technological means are often computational systems which are attached to the actor’s body and which require specialized knowledge which is difficult for actors to obtain in a short time. This means we need to carefully introduce them to the new possibilities of interactive costumes. These should provide easy and intuitive input, appropriate feedback, and ensure enough freedom for acting and moving, while supporting immersion into the role (Honauer, Hornecker 2015) Above all, an actress should gain basic knowledge about a costume’s technical operation as well as potential breakdowns, and should learn how to deal with these (Honauer, Hornecker 2015).

Apart from their use in costumes, new technologies have become invading the whole experience of theatre. There is, therefore, a number of different performance groups according to the use of technologies. According to Burgheim the existing categories are the following: 1) Digital performances combining computer graphics, 3D images, as well as cinematic techniques, Pepper’s Ghost, tulle or cyclorama, in some cases interactive – in real time or recorded – via technical manipulation from outside of the stage. The images are part of the stage design. 2) ‘Augmented’ performances in which the scene and/or the actors are interfaced via captors or technological and/or digital objects 3) Performances using artificial ‘performers’ or virtual characters 4) Digital performances that connect (an)other stage – either real or virtual – and play with the interconnection of different spaces of performance, perception and reality 5) Out-ofstage works that involve the audience – mostly individual spectators – through tools allowing them to move inside the scene or

interact with what they perceive, in a virtual recreation of the stage 6) Walking performances inviting the audience to move around on the stage or in the public space 7) Trans-media performing arts 8) Artivism (Burgheim, 2016). As examples of performances using these different technologies we could to the Belgian group Artara, directed by Fabrice Murgia, and its performance 'LIFE : RESET / Chroniqued' *unevilleépuisée*, the dance company Pulso, directed by Rocio Berenguer with its shows 'Homeostasis' and 'Corps/Non-Lieu' and the The Romanian artist Aurélie Ivan with her performance 'L'Androïde [HU#1]'. However, even though these technologies exist, they are not yet integrated in mainstream theatre. Firstly, there are theatrical institutions reluctant to use them as they consider that they cannot produce the experience of the traditional theatrical act. The sources of such distancing could be the fear (or at least the anxiety) of the disappearance of the live, the ephemeral and the singularity of the live performance; of the collective experience; of the disintegration of the stage as a space for humanity, a social link and political forum, both organised and spontaneous (Burgheim, 2016). Moreover, we should note that theatrical professionals are not really acquainted with these new technologies in order to be able to use them. Finally, the cost of being able to integrate them in their everyday practice is usually high, making it impossible for them to truly become a part of contemporary theatre.

We, therefore, see that integrating these technologies in theatre houses remains still a challenge for them to be fully in use in their performances. Even though we are awaiting to see them in vast use in the future, we should note that they are still not really practical. We should, also, note that, there is a number of research efforts for the exploitation of these technologies taking place. However, we have found out that there are not sufficient projects in place for promoting and preserving in a digital way our already existing living theatrical culture. In our project, we have tried to fill this empty space by presenting existing costumes digitally. More precisely, we are not opting in using these impractical technologies which we have just analyzed in creating a new artwork. In contrary, we are using already existing technology in an innovative way to promote existing parts of the theatrical act. Consequently, our program has to do with the development of new applications for the revival, representation and dissemination of intangible cultural heritage as expressed by the theatrical garment and the activities for which it is used. Moreover, we are preoccupied with the contemporary culture as expressed by the representation and use of clothing through synchronous technologies of sound, color, video and augmented reality.

As far as the use of existing technologies is concerned, we intend to produce new 360-Videos in a special virtual reality application (with special VR mask) where the visitor will watch "small performances" or parts of a performance and will be able to come in contact with the theatrical costumes and other elements of the actors during of the video. The user experience could be more vivid, including not only movement through an external bluetooth controller or the panel of the VR headset, but using special motion controllers that allow the user to participate in the application with the movement of his hands. Furthermore, we will create an AR application via mobile device / augmented reality glasses: It will be a special augmented reality application that will operate in a natural exhibition space. The visitor will be able to "scan with his mobile device or via AR headsets" exhibits, through the

application, and then they will be presented with 3D models of actors or / and citizens (avatars) who wore these clothes and could be represented and explained (through a synthetic voice) via stories that would highlight their historical use and their cultural value. As we have already referred to, we also care about wide spreading these costumes through their promotion via technological means. In order to succeed in it, we have created special business plans. Consequently, we address this project either to theatre spectators who care to learn about garment and costume either to theatre professionals, as actors and directors. Moreover, the technological results of the program are offered for commercial use by artists, historians, theatre scientists, dramaturgs, directors and costume designers, students, actors, ethnologists but also the wide public and both national and international museums. Consequently, it has become obvious that this is a project which also uses the available technologies of VR and AR in order to be exploited in the theatrical act, but for a different aim than the ones already described. The first and basic contemporary use of technology, nowadays, concerns innovative uses of the fabric itself in order to create new pieces of art. The projects in place, concerning garment, seem to care about what these technologies can do and not really how their results can be used. However, we opt for a different use of the current mostly academic way for creating new artworks which stay in the field of research or museums and cannot be promoted to the wide public as they are still not really practical. We are, therefore, using these existing technologies in order to promote existing parts of our living culture. Moreover, with this project, we desire to highlight the fact that theatre is an indispensable part of human history and that costume is a part of it which always mirrors artistic and social changes. In order to achieve this goal, we are tracking and recording existing theatrical garments and costumes and presenting it them in a new digital way. By this way, our ultimate goal is for them to gain a new audience and be used outside the strictly academic, research and museum prospect. To conclude, our project approaches costume and theatrical garment in a truly innovative and special way which has not be implemented in a similar way in research or theatrical practice.

## CONCLUSION

In this paper we have sufficiently analyzed the link between the theatrical experience, the theatrical costume and new technologies. We have focused on specific theatrical pioneers who have always been operating as part of their era, either by sensing the vibrations of social change ,as Inigo Jones in the 16<sup>th</sup> century and Isadora Duncan in the 20<sup>th</sup> century, or by using specific technological means that, also, hugely affected everyday life as Adolphe Appia and Edward Gordon Craig utilized electrical lightning. By referring to these different periods and artists ,marked by essential technological and social evolutions which have been also utilized and affected theatrical performances, we have ascertained our belief that theatre is and will always be a part of human history. We have established that social and technological change affects not only working or personal life but also theatre, stage design and theatrical costumes which, therefore, always operate as a lively and vivid part of society. Moreover, in this exact concept of theatre being a part of society, we have moved on to contemporary times and the rapid evolution of technology. We have referred to the precise nature of digital revolution and its impact on theatre by referring specific examples of theatrical performances. Finally, after establishing this link between the



contemporary use of new technologies and theatre we referred to our project which concerns the combination of theatrical costumes and new technologies. Therefore, by analyzing efforts already made and projects already implemented, we have observed that our effort to preserve and disseminate existing parts of our living culture to wide audiences via new technological means has not yet been realized by another institution. Culture, despite the evidence against it, is moving forward and it must do so. It has always functioned either by making man feel the exaltation created by high art or by having a therapeutic effect on him. New technologies also have this exact destination. If the "tragic" as a philosophical concept in the era of the 6th century BC was the conflict between the divine and the human, in the present age this conflict is occurring between man and the culture that he created and that is now turning against him. The pandemic we have been living for two years proves it once again. Technology in theater and essentially in costumes and on stage, has once again the same purpose: Firstly, to glorify man and his creativity, to expand the boundaries of creation for artists and enjoyment for spectators, and finally to glorify life itself and for all mankind. And, also, to help the performing arts and even theater and dance (for cinema it already does so thanks to the Hollywood industry in particular), to expand experience and enjoyment or - why not - to create a new art. We have new means in our hands, new means to record our culture and push it to a better future. These new media have a duty to further humanize their creator, to expand his spirit and freedom. If they are moving in the opposite direction, towards humanization and acquisition then they are better off missing.

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