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EPM

EUROPEAN PUPILS *MAGAZINE*

History of Science and Technology

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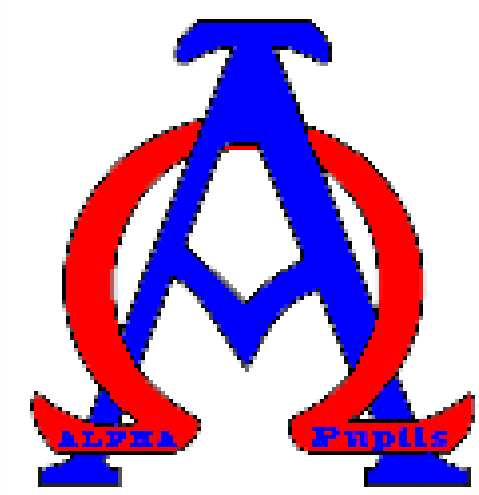

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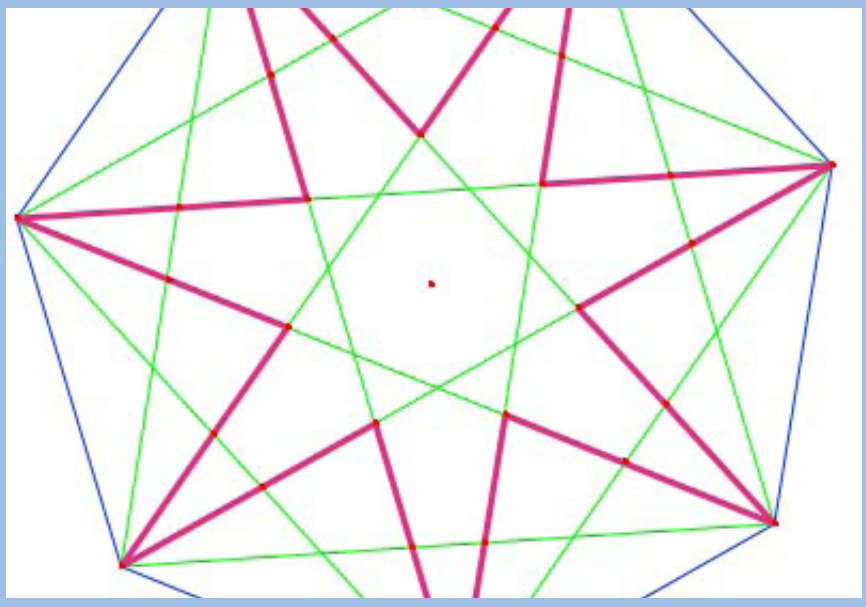

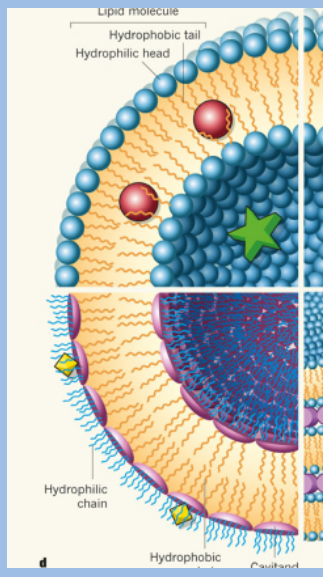

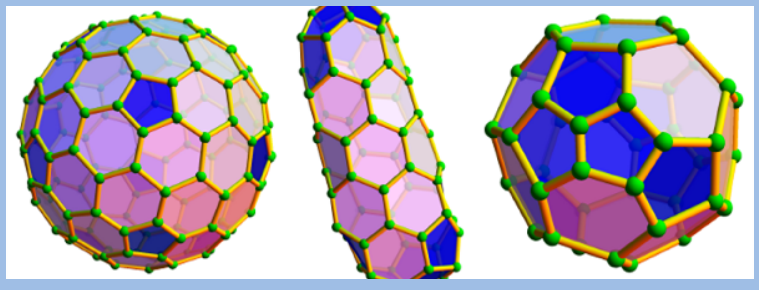

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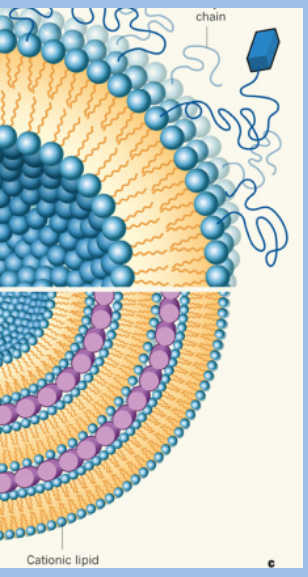

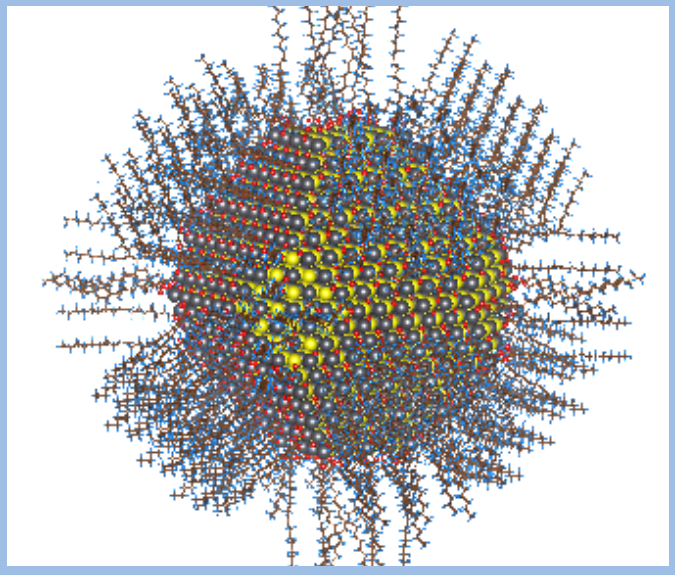

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EDITORIAL

Call for contribution and cooperation to EP*Magazine* educational and scientific activities

Our century is characterized by an incredible technological progress and amazing discoveries.

Every day we get up so immersed in technology, that we don't realize the little miracle happening when we turn on the lights, open the water tap or make a coffee. Behind every little action there is a long unknown history. Sometimes we forget the importance of someone, in the past, who sacrifices everything for what he believed in.

Now, more people, including us, don't understand what there is around in the social world, we go to a place when someone says go; we stop when someone says stop, and so on.

So, we want ask you if you prefer to be an instrument used by other people or you want to be someone who understands what you have in the hand and use it knowing the reason.

If you choice the first option, we're happy for you; your life will be quite and normal.

If you prefer the second option, come with us start cooperating to EP*Magazine* (European Pupils Magazine) your life will become a bit more difficult, but your skills will dramatically develop better and better.

EP*Magazine* is a scientific international magazine written in different European languages by young (mainly) and adult people (sometimes), that collaborate together.

These activities will lead you to a face to face confrontation between different cultures with their difficulties and misunderstandings; we can promise you also, and lots of people can confirm it, that it could be an unforgettable experience.

Our educational editorial scientific work is developed throughout History of Science and Technology, thus on finding the reason of the scientific and technological data, as well as why they have been taken some choices and not others.

We try to tell you the true about false stories.

So, what are you waiting for looking EP*Magazine* on internet, contact us and enter a world that for your first time may seem strange but soon you will start loving it because you realize the importance of these activities.

If you want to be the man/woman who knows every reason of scientific phenomena and be capable of use the available instruments, stop postponed the day when you get up, and act now, joining EP*Magazine*.

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EP*Magazine* Italian Editorial Board
Michele Pan & Francesco Moschetto

First EP*Meeting* in Kramsach, Austria, 2002

ΕΚΔΟΤΙΚΟ ΣΗΜΕΙΩΜΑ

Κάλεσμα για συμμετοχή και συνεργασία στις εκπαιδευτικές και επιστημονικές δραστηριότητες του περιοδικού EPM.

Ο αιώνας μας χαρακτηρίζεται από μια απίστευτη τεχνολογική πρόοδο και εντυπωσιακές ανακαλύψεις. Κάθε μέρα βρισκόμαστε τόσο βαθιά στην τεχνολογία, που δεν καταλαβαίνουμε το μικρό θαύμα που συμβαίνει όταν ανάβουμε τα φώτα, ανοίγουμε τη βρύση ή κάνουμε καφέ.

Πίσω από κάθε μικρή δράση υπάρχει μια ιστορία που είναι άγνωστη εδώ και πολύ καιρό. Έτσι, πολλές φορές ξεχνάμε τη σημασία κάποιου από το παρελθόν, ο οποίος θυσίασε τα πάντα για αυτό πού πίστευε.

Σήμερα οι περισσότεροι άνθρωποι, όπως κι εμείς, δεν καταλαβαίνουν τι συμβαίνει γύρω τους και όταν τους λέει κάποιος πήγαινε, πηγαίνουν, όταν τους λέει κάποιος σταμάτησε, σταματούν και πάει λέγοντας.

Έτσι, θα θέλαμε να σε ρωτήσουμε αν προτιμάς να είσαι ένα όργανο που θα σε χρησιμοποιούν οι άλλοι ή θα ήθελες να είσαι αυτός που καταλαβαίνει τι έχει στο χέρι του και το χρησιμοποιεί ξέροντας το λόγο.

Αν διαλέγεις την πρώτη επιλογή, είμαστε χαρούμενοι για σένα.

Η ζωή σου θα είναι ήσυχη και κανονική. Αν προτιμάς τη δεύτερη επιλογή, τότε έλα μαζί μας και άρχισε να συνεργάζεσαι με το περιοδικό **EPM** (European Pupils Magazine). Η ζωή σου θα γίνει λίγο πιο δύσκολη, αλλά οι δεξιότητές σου θα αναπτύσσονται όλο και περισσότερο.

Το **EPM** είναι ένα διεθνές επιστημονικό περιοδικό που γράφεται σε διάφορες ευρωπαϊκές γλώσσες από νέους (κυρίως) και ενήλικες (μερικές φορές), οι οποίοι συνεργάζονται μεταξύ τους. Οι δραστηριότητες του περιοδικού θα σε οδηγήσουν σε μία γνωριμία με διαφορετικές κουλτούρες με τις δυσκολίες και τις παρανοήσεις που τυχόν θα παρουσιαστούν.

Μπορούμε όμως να σου υποσχεθούμε ότι θα είναι μία αξέχαστη εμπειρία, όπως πολλοί άνθρωποι μπορούν, ήδη, να το επιβεβαιώσουν.

Η εκπαιδευτική και επιστημονική μας αναζήτηση αφορά την Ιστορία της Επιστήμης και της Τεχνολογίας, όπου ψάχνουμε να βρούμε την αιτία των επιστημονικών και τεχνολογικών ανακαλύψεων, για να εξηγήσουμε γιατί έγιναν κάποιες επιλογές και όχι κάποιες άλλες. Προσπαθούμε να βρούμε αλήθειες για ψεύτικες ιστορίες.

Λοιπόν τι περιμένεις κοιτάζοντας το περιοδικό **EPM** στο διαδίκτυο; Έλα σε επαφή μαζί μας και μπες σε ένα κόσμο που την πρώτη φορά θα σου φανεί περίεργος, αλλά σύντομα θα αρχίσει να σου αρέσει, επειδή θα διαπιστώσεις τη σημασία αυτών των δραστηριοτήτων.

Αν θέλεις να είσαι ο άνθρωπος που θα ξέρει την αιτία των επιστημονικών φαινομένων και θα είσαι ικανός να χρησιμοποιείς τα απαραίτητα εργαλεία, πάψε να αναβάλεις τη μέρα που θα σηκωθείς και θα δράσεις αμέσως. Έλα τώρα στο περιοδικό **EPM**.

Για περισσότερες πληροφορίες στείλε email:
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Για να υποβάλλεις εργασίες (Άρθρα, σελίδες διασκέδασης, νέα) χρησιμοποίησε τη διεύθυνση: issuingepm@epmagazine.org.

Επισκέψου την ιστοσελίδα μας: www.epmagazine.org

Για την ιταλική εκδοτική ομάδα του **EPM**:
Michele Pan & Francesco Moschetto

EPMeeting in Thessaloniki, Greek, 2006

EDITORIALE

Cooperazione e invio contributi
EP*Magazine* attività scientifiche ed educative

Il nostro secolo è caratterizzato da un incredibile progresso tecnologico e da fantastiche scoperte. Ogni giorno ci alziamo così immersi nella tecnologia che non riusciamo a cogliere il piccolo miracolo che avviene quando accendiamo la luce, apriamo l'acqua o facciamo il caffè. Dietro ogni piccola azione c'è una lunga storia sconosciuta. A volte ci dimentichiamo dell'importanza di qualcuno, nel passato, che ha sacrificato tutto per quello in cui credeva. Dobbiamo anche capire che molte persone, incluse noi, non capiamo cosa c'è nel mondo sociale; andiamo in un posto quando qualcuno dice vai; ci fermiamo quando qualcuno dice fermo, e così via. Vogliamo chiederti se tu preferisci diventare uno strumento usato da altre persone o vuoi diventare qualcuno che capisca che cosa ha in mano e usarlo con la coscienza di sapere realmente cosa fa e perché. Se scegli la prima opzione, siamo felici per te, la tua vita sarà calma e normale. Se preferisci la seconda scelta, vieni con noi e inizia a cooperare con EP*Magazine* (European Pupils Magazine) la tua vita sarà un po' più difficile, ma le tue abilità si svilupperanno incredibilmente sempre più. EP*Magazine* è una rivista internazionale scientifica scritta in diverse lingue europee da giovani (principalmente) e da persone adulte (qualche volta) che collaborano insieme. Queste attività ti porteranno a un faccia a faccia tra culture diverse, con le loro difficoltà ed incomprensioni, e possiamo prometterti, inoltre (e molta gente può confermarlo), che potrebbe essere un'esperienza indimenticabile.

Il nostro lavoro scientifico editoriale educativo è sviluppato attraverso la Storia della Scienze e della Tecnologia, così da trovare il perché dei dati scientifici e tecnologici, come la ragione per cui sono state selezionate alcune scelte e non altre. Noi cerchiamo di raccontare il vero sulle storie false. Dunque, cosa stai aspettando per cercare EP*Magazine* su internet, contattarci ed entrare in un mondo che inizialmente può sembrare strano ma presto inizierai ad amarlo perché capirai l'importanza di questa attività. Se tu vuoi diventare l'uomo/la donna che conosce ogni perché dei fenomeni scientifici ed essere in grado di usare gli strumenti disponibili, smetti di rimandare il giorno in cui ti sveglierai, e agisci ora. Entra in EP*Magazine*.

Per altre informazioni contattaci a:
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EP*Meeting* in Kastamonu, Turkey, 2011

EP*Meeting* in Catania, Italy, 2012

EP*Meeting* in Landgraaf, Neverland, 2005

LEITARTIKEL

Einladung zur Unterstützung und Mitarbeit bei den Bildungs- und Wissenschaftsaktivitäten des European Pupils Magazine

Unsere Welt hat in den letzten hundert Jahren einen immensen technologischen Fortschritt erfahren und wird sich durch bahnbrechende Erfindungen weiter verändern.

Wir haben uns an eine ganze Reihe technologischer Errungenschaften gewöhnt und entweder vergessen oder nie erfahren, welcher Ehrgeiz, welche Passion und welche Anstrengungen dazu nötig waren. Damit das Licht angeht, wenn man einen Schalter umlegt oder Trinkwasser aus dem Wasserhahn kommt, oder wie einfach man immer und überall mit Bild, Text und Ton kommunizieren kann.

Entscheiden Sie, ob sie die Möglichkeiten der modernen Technologien einfach nur nutzen wollen oder auch über Grundlagen, Hintergründe und historische Zusammenhänge informiert sein wollen.

Wenn Sie sich für die zweite Option entscheiden, arbeiten Sie beim **EP*Magazine*** mit! So können Sie anderen helfen, Technologie und Wissenschaft besser zu verstehen und selbst von dieser Gemeinschaft profitieren.

Das **EP*Magazine*** ist ein internationales Wissenschaftmagazin, dessen Beiträge überwiegend von Schülern und Studenten durch Kooperationen entstehen und in den jeweiligen Nationalsprachen sowie einer englischen Version veröffentlicht werden.

Dabei erfahren Sie auch kulturelle Gemeinsamkeiten und Unter-schiede und legen so eine wichtige Grundlage für eine gemeinsame Zukunft in Europa.

Das **EP*Magazine*** legt den Fokus der Artikel auf die Geschichte der Wissenschaft und Technologie. Dies hilft die Entwicklungrichtung von Technologien zu verstehen und nachzuvollziehen.

Lesen Sie also nicht nur das **EP*Magazine*** über unsere Internet-seite, nehmen Sie Kontakt mit uns auf und arbeiten Sie mit.

Für weitere Informationen kontaktieren sie:
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EPMagazine Italian Editorial Board
Michele Pan & Francesco Moschetto

EP*Meeting* in Sosnowiec, Poland, 2003

EP*Meeting* in Kayseri, Turkey, 2006

РЕДАКЦИОННИ БЕЛЕЖКИ

Покана за участие и сътрудничество с EPMagazine за образователни и научни дейности

Нашият век се характеризира с невероятен технологичен напредък и невероятни открития. Всеки ден ние сме изправени и толкова потопени в технологията, че не си даваме сметка за малкото чудо, което се случва, когато се включи светлината, отваря крана за водата или когато правим кафе. Зад всяко малко действие има дълга и непозната история. Понякога ние забравяме значението на някого, в миналото, който е жертвал всичко, в което е вярвал. Сега, повече хора, включително и ние, не разбираме какво има наоколо в социалния свят, отиваме на място, когато някой каза, отидете; спираме, когато някой каза, спрете, и така нататък.

Така че, ние искаме Ви попитаме, дали предпочитате да бъдете инструмент, използван от други хора, или искате да бъдете някой, който разбира това, което има в ръката и да го използва знаейки причината.

Ако изберете първия вариант, ние сме щастливи за вас; животът ви ще бъде спокоен и нормален. Ако предпочитате втория вариант, елате с нас започнете да сътрудничите на **EP*Magazine*** (Европейско ученическо списание); животът ви ще стане малко по-труден, но уменията Ви драстично ще се развиват към по-добри и по-добри. **EP*Magazine*** е научно международно списание, написано на различни европейски езици от млади (предимно) и възрастни хора (понякога), които си сътрудничат. Тези дейности ще ви доведат до конфронтация между различните култури с техните трудности и недоразумения; ние можем да ви обещаем, а и много хора могат да го потвърдят, че това може да бъде едно незабравимо преживяване.

Нашата образователна редакционната научна работа е насочена към цялата история на науката и технологиите, като по този начин намираме причината за научните и технологични данни, както и защо са взети някои решения, а други не. Ние се опитваме да ви кажем истината за фалшиви истории.

Така че, какво чакате, а не потърсите **EP*Magazine*** по интернет, не се свържете с нас и влезете в един свят, който на пръв поглед може да изглежда странно, но скоро ще започне да Ви харесва, защото разбирате значението на тези дейности.

Ако искате да бъде мъж / жена, която знае всички основания на научните феномени и може да използва наличните инструменти, спрете отлагането на деня, когато ще се изправите, и действайте сега, присъединявайки се към **EP*Magazine***.

За повече информация се свържете с нас на адрес:
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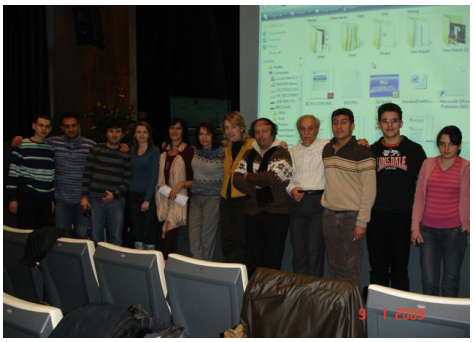
EP*Magazine*, Италиански Редакционен съвет
Michele Pan & Francesco Moschetto



EP*Meeting* in Instambul, Turkey, 2009

EDITORIAL

Apel pentru contribuția și cooperarea la activitățile educaționale și științifice ale EP*Magazine*

Datorită incredibilului proges tehnologic și a uimitoarelor descoperiri, suntem atât de absorbiți de tehnologie, în zilele noastre, încât nu realizăm acel mic miracol întâmlându-se când aprindem lumina, deschidem robinetul sau facem o cafea. Prin urmare, noi neglijăm faptul că aceste lucruri obișnuite sunt posibile datorită marilor descoperiri făcute de oameni iluștri, în urmă cu mult timp. Uneori uităm importanța cuiva din trecut, care a sacrificat totul pentru acel lucru în care respectiva persoană a crezut.

În prezent, majoritatea oamenilor, inclusiv noi, nu înțeleg ceea ce se întâmplă cu adevărat în lumea socială, ne limităm în a face ceea ce ni se spune, a merge undeva atunci când cineva ne spune să mergem; ne oprim când cineva ne spune ”stop”, etc.

Prin urmare, dorim să te întrebăm dacă preferi să fii un instrument folosit de ceilalți oameni sau dacă vrei să fii cineva care înțelege ceea ce deține și folosește ceea ce deține fiind pe deplin conștient de motivația sa.

Dacă vei alege prima opțiune, ne bucurăm pentru tine; viața ta va fi una liniștită și normală. Dacă preferi a doua opțiune, alătură-te nouă prin cooperarea cu EP*Magazine* (European PupilsMagazine). Viața ta ar putea deveni puțin mai complicată, dar aptitudinile tale se vor dezvolta, cu siguranță. EPMagazine este o revistă științifică internațională, scrisă în diferite limbi europene de către tineri (în mare parte) și adulți (uneori) care colaborează. Aceste activități te vor conduce spre o confruntare față în față între diferite culturi, dificultățile și neînțelegerile acestora; îți putem promite, de asemenea, și mulți oameni pot confirma, faptul că acest lucru ar putea fi o experiență de neuitat.

Activitatea noastră educațională, editorială și științifică se desfășoară în domeniul istoriei științei și tehnologiei (History of Science and Technology), încercând să deslușească resortul dezvoltării tehnologice și științifice și deopotrivă motivele pentru care anumite alegeri au fost făcute în detrimentul altora. Noi vom încerca să îți dezvăluim adevărul despre povești false.

Deci, dacă am reușit să te convingem, poți începe prin a citi EP*Magazine* pe internet, a ne contacta și a intra într-o lume care îți poate părea ciudată dar care, cu siguranță, va începe repede să îți placă, pentru că vei ajunge să realizezi importanța acestor activități.

Dacă vrei să fii genul de om care cunoaște motivele diverselor fenomene științifice și să fie capabil de a utiliza intrumentele disponibile, încetează în a amâna deșteptarea și acționează acum, alăturându-te echipei EP*Magazine*.

Pentru informații adiționale, contactează-ne la:
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EPMagazine Italian Editorial Board
Michele Pan & Francesco Moschetto

EP*Meeting* in Bucharest, Romania, 2010

EDITORIAL

Llamada para contribuciones y cooperación con EP*Magazine* educational and scientific activities

Por un avance tecnológico increíble y descubrimientos sorprendentes. Todos los días nos levantamos tan inmersos en la tecnología, que no nos damos cuenta del pequeño milagro que sucede cuando encendemos las luces, abrimos el grifo de agua o hacemos un café. Detrás de cada pequeña acción hay una larga historia desconocida. A veces nos olvidamos de la importancia de que alguien, en el pasado, que sacrifica todo por lo que él creía.

Ahora, más personas, incluidos nosotros, no entendemos lo que hay alrededor en el mundo social, que van a un lugar cuando alguien dice ir; que nos detenemos cuando alguien dice para, y así sucesivamente.

Por lo tanto, queremos preguntarle si usted prefiere ser un instrumento utilizado por otras personas o si desea ser alguien que entiende lo que tiene en la mano y lo utilizan conociendo la razón.

Si eliges la primera opción, estamos felices por usted; su vida será tranquila y normal. Si prefiere la segunda opción, venga con nosotros a comenzar a cooperar con EP*Magazine* (Revista Europea de Alumnos) su vida va a ser un poco más difícil, pero sus habilidades se desarrollan rápidamente mejor y mejor. EP*Magazine* es una revista internacional científica escrita en diferentes idiomas europeos por jóvenes (principalmente) y adultos (a veces), que colaboran entre ellos. Estas actividades le llevarán a una confrontación cara a cara entre las diferentes culturas, con sus dificultades y malentendidos; podemos prometer también, y mucha gente puede confirmarlo, que podría ser una experiencia inolvidable.

Nuestro trabajo científico editorial educativo se desarrolla a lo largo de la Historia de la Ciencia y la Tecnología, por tanto, en la búsqueda de la razón de los datos científicos y tecnológicos, así como porqué se han tomado algunas decisiones y no otras. Tratamos de decirle la verdad acerca de falsas historias.

Entonces, ¿qué está esperando para mirar EP*Magazine* en Internet?, póngase en contacto con nosotros y entre en un mundo que por primera vez puede parecer extraño, pero que pronto comenzará a amar porque te das cuenta de la importancia de estas actividades.

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From the 14th Century to Cabrì

Convoluted Constructions of Star Polygons

DAL '300 AL CABRÌ: LE ARZIGOGOLATE COSTRUZIONI DEI POLIGONI STELLATI

by **Nicla Palladino**

Introduction

The first treatments of regular star polygons seem to date back to the fourteenth century, but a comprehensive theory on the subject was presented only in the nineteenth century by the mathematician Louis Poinsot.

After showing how star polygons are closely linked to the concept of prime numbers, I introduce here some constructions, easily reproducible with geometry software that allow us to investigate and see some nice and hidden property obtained by the scholars of the fourteenth century onwards.

Regular star polygons and prime numbers

Divide a circumference into ***n*** equal parts through ***n*** points; if we connect all the points in succession, through chords, we get what we recognize as a regular convex polygon. If we choose to connect the points, starting from any one of them in regular steps, two by two, or three by three or, generally, ***h*** by ***h***, we get what is called a regular star polygon.

It is evident that we are able to create regular star polygons only for certain values of ***h***.

Let us divide the circumference, for example, into 15 parts and let's start by connecting the points two by two. In order to close the figure, we return to the starting point after two full turns on the circumference. The polygon that is formed is like the one in Figure 1: a polygon of "order" 15 and "species" two. For ***h***=7 we get again a regular star polygon of order 15 and species seven:

If we try to connect the points three by three (***h***=3), the figure closes almost immediately and we finish before we touch all the points. By linking the points three by three, we return to the starting point at the fifth step and we draw only five segments. This happens because three is a divisor of 15. The same thing happens if we choose ***h***=5 (also a divisor of 15): after three steps, we return to the starting point and we draw a triangle.

Introduzione

Le prime trattazioni dei poligoni stellati sembrano risalire al Trecento, ma una organica teoria sull'argomento fu presentata solo nell'Ottocento dal matematico Louis Poinsot.

Dopo aver mostrato come i poligoni stellati sono strettamente legati al concetto di numero primo, vengono presentate alcune costruzioni, riproducibili facilmente con software geometrico, che consentono di indagare e visualizzare alcune nascoste e simpatiche proprietà ricavate dagli studiosi di Geometria dal Trecento in poi.Poligoni stellati e numeri primi

Presa una circonferenza, suddividiamola in ***n*** parti eguali mediante ***n*** punti; se uniamo tutti i punti in successione, mediante segmenti, si ottiene quello che riconosciamo essere un poligono regolare e convesso.

Se invece scegliamo di unire i punti di divisione, a cominciare da uno qualsiasi di essi, di due in due, di tre in tre o, in generale, di ***h*** in ***h***, riusciamo ad ottenere quelli che vengono definiti poligoni stellati.

È subito evidente che si riesce a formare un poligono stellato solo con dei valori di ***h*** presi in modo particolare.

Proviamo dividendo la circonferenza, ad esempio, in 15 parti.

Iniziamo con l'unire i punti di due in due; per poter chiudere la figura, ritorniamo al punto di partenza dopo due giri completi sulla circonferenza.

Il poligono che si viene a formare è come quello in figura: un poligono di "ordine" 15 e di "specie" due. Per ***h***=7 ottengo di nuovo un poligono stellato, di ordine 15 e di specie sette:

Se proviamo ad unire i punti di tre in tre (***h***=3), la figura si chiude quasi subito e ci fermiamo prima di aver toccato tutti i punti; la stessa cosa accade quando scegliamo ***h***=5:

Unendo i punti di tre in tre, al quinto passaggio sarò tornato al punto iniziale, essendo 3*5=15, e quindi sarò arrivato al vertice di

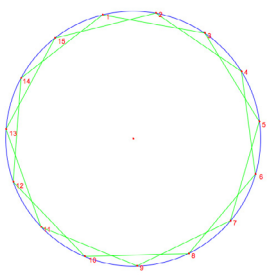

Figure 1: Regular star polygon with ***n***=15 and ***h***=2

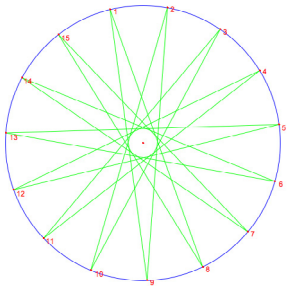

Figure 2: Regular star polygon with ***n***=15 and ***h***=7

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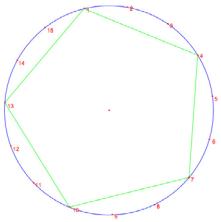


Figure 3: Regular polygon with ***n***=15 and ***h***=3

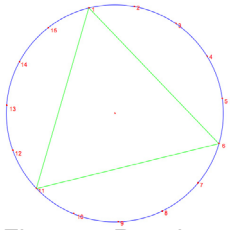


Figure 4: Regular polygon with ***n***=15 and ***h***=5

If we take a number that has no common divisors with 15 (for example, two), we return to the starting vertex and close the figure only if we touch all the points.

So it is possible to conclude that we are able to build regular star polygons only when ***n*** and ***h*** are coprime integers.

Through regular star polygons we can offer an alternative geometric instead of arithmetic definition of coprime integer numbers and also of prime numbers.

Mathematicians define polygons by order and species: formally two polygons are of the same order if they have an equal number of sides while two polygons are of the same species if the sum of their angles is equal. The sum of angles varies from polygon to polygon within a given order depending on the value of ***h***, which denotes the step chosen to connect the points.

A prime number (or a prime) is a natural number greater than 1 that has no positive divisors other than 1 and itself. A natural number greater than 1 that is not a prime number is called a composite number. Book VII of Euclid's Elements (circa 300 BC) contains the definition (number XI) and important theorems about primes, including the infinitude of primes and the fundamental theorem of arithmetic.

Two integers are said to be coprime if the only positive integer that evenly divides both of them is 1.

The geometrical definitions for prime number and coprime numbers were given by the French mathematician Louis Poinsot (1777-1859) in Mémoire sur les polygones et les polyedres : let ***n*** be the order of a regular star polygon and let h be its species. If we connect the ***n*** points A, B, C, … in regular steps ***h*** by ***h*** and we touch all the points before returning to the starting point, then number ***h*** is coprime to ***n***.

But if we connect all the ***n*** points for any ***h*** but we can never return to the first one without going through all the others, then none of the ***h*** values divides ***n*** and ***n*** is a prime number.

partenza dopo soli cinque passi e tracciando solo cinque segmenti.

Questo perché tre è un divisore di 15. Avrò disegnato allora un semplice pentagono.

La stessa cosa accade con il cinque (che è anche esso un divisore di 15): dopo tre passi, ritorno al punto di partenza e mi ritroverò con un triangolo.

Se prendo un numero che non abbia fattori comuni con 15, ad esempio il due, per poter tornare al vertice di partenza, dovrò toccare tutti i punti.

Così se scelgo ***h***=4 o qualsiasi altro numero che non abbia fattori comuni con 15.

Allora si conclude che riesco a costruire un poligono stellato solo quando ***n*** ed ***h*** sono numeri coprimi tra loro.

Con i poligoni stellati si può dare una definizione alternativa, geometrica e non aritmetica di numeri coprimi tra loro e anche di numero primo.

Come accennato, nei poligoni si possono distinguere l'ordine e la specie: formalmente due poligoni si dicono "dello stesso ordine" quando hanno un ugual numero di lati e "della stessa specie" quando la somma degli angoli è uguale in entrambi.

Siccome al variare di quest'ultima somma, per ciascun ordine, varia pure il numero di volte che il perimetro fa il giro della circonferenza circoscritta, si può indicare la specie con questa quantità.

È, insomma, quello che abbiamo indicato con ***h***.

Ricordiamo la definizione aritmetica di numero

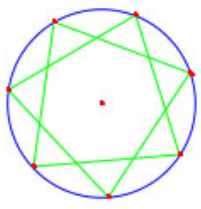


Figure 5: The seven-sided regular star polygon when h=2

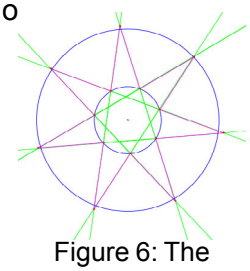


Figure 6: The seven-sided regular star polygon when h=3

primo: "Un numero intero positivo, o "naturale" ***n*** (eccetto il numero 1), che abbia come divisori solo 1 e se stesso, è detto numero primo.

Volendo risalire alle origini, ci dobbiamo sicuramente soffermare sulla definizione XI del Libro VII che diede Euclide nei suoi Elementi.

Se due o più numeri non hanno fattori comuni, si dicono "coprimi" o "primi tra loro".

Le rispettive definizioni geometriche fu-

In the latter case, obviously, we cannot draw any star polygon, but only convex polygons.

Several Construcions from the fourteenth century

The ancient geometers studied only regular or irregular convex polygons and we must go back to Boezio's De geometria, to see what might be the first example of a regular star pentagon inscribed in a circle.

At the beginning of the fourteenth century, Thomas Bradwardine (1290-1349) created a theory of regular star polygons. He stated several propositions and reached some remarkable conclusions: the first regular star polygon of the second species is the five-sided polygon; the sum of the angles of the five-sided star polygon is equal to two right angles; heptagon is the first regular star polygon of the third species.

Bradwardine stated the general principle: the first regular star polygon of any species is obtained by extending the sides of the third constructible figure of the previous species.

For example, let species ***h***=3; in order to build the first regular star polygon when ***h***=3, we need to create the third regular star polygon of species ***h***-1=2.

For ***h***=2, the first regular star polygon is five-sided, the second one is the six-sided, and the third one is the seven-sided. By extending the sides of the seven-sided regular star polygon of species two, we are able to obtain the even-sided regular star polygon of species three:

By induction, Bradwardine also proposed the following theorem: for any given species, the sum of the angles of the first regular star polygon constructible for this species always equals two right angles; the sum of the angles of all other regular star polygons constructible for this same species increases by two right angles as we move from one figure to the next.

Cardinal Daniele Barbaro (1514-1570) in his treatise on perspective shows that regular polygons give rise to other polygons in two ways: the first way is to extend the sides until they meet; the meeting points are the vertices of a new polygon similar to the first one. The second way is to draw all the diagonals from each vertex to its non-adjacent vertices; their intersections form a second polygon similar to the original.

How to reproduce Barbaro's figures and constructions? One way is to exploit a plain geometry software like the Cabrì®. To construct superior species heptagons, use the regular polygon instrument from Lines toolbar, make a regular heptagon (in blue on pic. 9); using the instrument line of Lines toolbar, it is possible to construct the extensions of each side of the

rono date dal matematico francese Louis Poinsot (1777-1859) Mémoire sur les polygones et les polyedres : sia n l'ordine di un poligono stellato e sia h la specie; può accadere che unendo n punti A, B, C, … di h in h si passi per tutti questi punti prima di ritornare a quello di partenza; il numero h sarà allora necessariamente coprimo con n.

Ma, se unendo alla stessa maniera (ossia con tutti i numeri h minori di n) gli n punti ad intervalli qualsiasi uguali, non si può mai ritornare al primo senza passare per tutti gli altri, vuol dire che nessun h è un divisore di n, ossia si può affermare che n è primo.

In questo caso non riesco a disegnare nessun poligono stellato.

Alcune costruzioni dal Trecento al Cabrì

Gli antichi geometri avevano studiato solo poligoni, regolari o irregolari, convessi e si risale a Boezio, in De geometria, per avere, forse, il primo esempio, che sia noto, dell'iscrizione del pentagono regolare stellato nel cerchio.

Al principio del secolo quattordicesimo, Tomaso Bradwardino (1290-1349) aveva creato una teoria dei poligoni stellati. Questi enuncia diverse proposizioni, arrivando ad

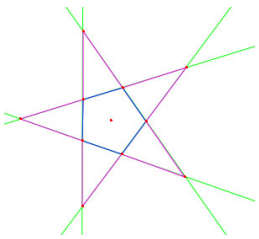


Figure 7: Regular star pentagon generated by extending sides of another polygon

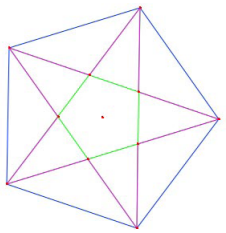


Figure 8: Regular star pentagon generated by drawing diagonals of another polygon

alcune notevoli conclusioni: il primo poligono stellato di seconda specie è quello a cinque lati; il pentagono stellato ha la somma degli angoli pari a due retti; l'ettagono è la prima figura stellata di terza specie; enuncia il principio generale che la prima figura di una qualunque specie è formata dai prolungamenti dei lati della terza figura costruibile della specie precedente.

Ad esempio, fissata la specie h=3, per ottenere il primo poligono stellato con la specie assegnata, si può costruire la terza figura di specie h-1=2.

Per h=2, il primo poligono costruibile è il pentagono, segue l'esagono, e poi l'ettagono. Prolungando quindi i lati di un ettagono di specie 2, si ottiene un ettagono di

heptagon, creating the lines passing for each couple of adjacent vertices that mark the polygon sides.
Through intersection point from toolbox Points the intersection points are marked between the lines constructed. These will be the vertices of the new, superior order star polygons. To highlight them, using the instrument polygon, from toolbox Lines, make the polygon passing for all those ordered points, as in pictures 9 and 10 (violet).
As to Barbaro's second method, always starting from the regular heptagon, all possible diagonals are drawn using the instrument segment from the toolbox Lines. Then, with intersection point all segment intersection points are marked. These are going to be the vertices of the new, superior order star polygons. To highlight them, using the instrument polygon, from toolbox Lines, make the polygon which passes for all those ordered points, as in pictures 11 and 12 (violet).
Bradwardine's theory of polygons is treated by the Polish Jo Brosius (1585-1652) in his work Apologia pro Aristotele et Euclide contra Petrum Ramum. He also conceived a special procedure for the construction of star polygons. For example, take a regular convex heptagon and divide all sides through the midpoint. Brosius joins two consecutive midpoints with segments and overturns the small triangles generated on the heptagon along the segments, creating a fourteen-sided polygon. He consecutively connects the inner vertices and overturns the small triangles generated along the segments, creating a new fourteen-sided polygon. The two figures built are two regular star polygons, heptagons of the second and third species. Brosius' construction of polygons with different areas is an interesting example as every polygon is included in the previous one, but has the same perimeter. Also in order to build isoperimetrical polygons the Cabrì® can be used as well as verify their properties. Using the instrument regular polygon, make a regular polygon. With the instrument distance or length from toolbox Measurement, measure its perimeter. Then, build the midpoints of each side with the instrument Midpoint, from toolbox Construction. After that, with the instrument triangle from toolbox Lines, for each vertex of the heptagon, build a triangle with vertex and the two midpoints being adjacent to it.
With the function reflection, from toobox Transformations, reverse each isosceles triangle from its basis. Use the function polygon to join in sequence all the triangles obtained. Thus, a II species heptagon is built (in red on picture 14). Then measure the polygon perimeter. .

specie 3:

Egli giunge, per induzione, anche al teorema: fissata la specie, il primo poligono stellato costruibile con la specie assegnata ha la somma dei suoi angoli sempre uguale a due retti; nei successivi poligoni stellati costruibili con quella stessa specie, la somma degli angoli va aumentando di due retti passando da una figura alla successiva.

Il cardinale Daniele Barbaro (1514-1570) nel suo trattato di prospettiva mostra che i poligoni regolari danno luogo in due modi ad altri poligoni: la prima maniera è di prolungarne i lati fino al loro incontro a due a due; i punti d'incontro sono i vertici di un nuovo poligono simile al primo.

La seconda maniera consiste nel tracciare tutte le diagonali da ciascun vertice ai vertici non adiacenti; esse formano con le loro intersezioni un secondo poligono ancora simile al dato.

La teoria dei poligoni egredienti di Bradwardino viene ripresa dal geometra polacco Ioanne Broscio (1585-1652) nel lavoro Apologia pro Aris-

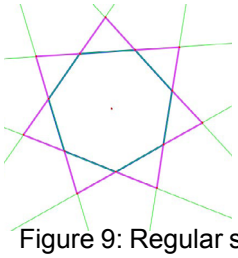


Figure 9: Regular star heptagon generated by extending sides of another polygon

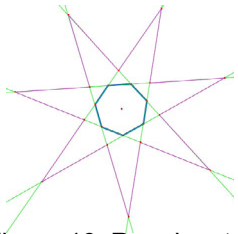


Figure 10: Regular star heptagon generated by extending sides of another polygon

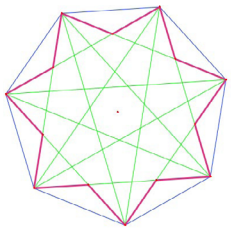


Figure 11: Regular star heptagon generated by drawing diagonals of another polygon

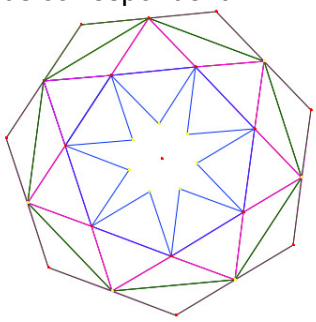
totele et Euclide contra Petrum Ramum.

Questi ideò un singolare procedimento per la costruzione dei poligoni stellati.

Preso, ad esempio, un ettagono regolare convesso, si dividano a metà tutti i lati. Intorno a ciascun segmento congiungente due punti medi consecutivi, Broscio ribalta il piccolo triangolo che questo segmento stacca dall'ettagono, finché questo triangolo cade nell'interno della figura.

Ottiene così un poligono di quattordici lati ad angoli che definisce "salienti" e "rientranti" alternativamente.

It is possible to continue by joining in ordered couplet the “inner” vertices of the polygon obtained. Like before, all newly formed small triangles are reversed from their basis. Use the function polygon to join the vertices of all formed triangles. A new star heptagon is then created (in blue on pic. 15). Measure the polygon perimeter to ensure it equals that of previous heptagons. With the instrument area from toolbox Measurement we can assess the areas of the three heptagons obtained to ascertain as each is smaller than its previous correspondent.



Heptagon of species III

Conclusion

In primary and secondary level schools, regular stars polygons are only briefly explained and, when they are, it is not for their geometric peculiarities, but for their relevance to prime numbers. Even now, the argument is not extensively treated. Notwithstanding, one can see from the constructions presented above that regular star polygons allow digressions and insights into various branches of mathematics, ranging from arithmetic to geometry. Finally, by using interactive geometry software (here we used Cabrì®), the buildings are fun and simple and help to highlight special properties of polygons.

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Intorno a ciascun segmento congiungente due vertici d’angoli “rientranti” successivi del poligono di quattordici lati, ribalta il piccolo triangolo da essa distaccato; risulta un nuovo poligono di quattordici lati ad angoli alternativamente “salienti” e “rientranti”. Le due figure cosi generate non sono altro che gli ettagoni di seconda e terza specie.

Conclusioni

I poligoni stellati vengono solo brevemente presentati nelle scuole primaria e secondaria di primo grado, non tanto per le loro caratteristiche geometriche, quanto per la loro stretta connessione con i numeri primi.

Ancora adesso l’argomento non è ampiamente affrontato, nonostante, come si evince anche dalle costruzioni presentate, i poligoni stellati consentono digressioni e approfondimenti in vari rami della matematica, dall’ambito aritmetico a quello geometrico.

Un esempio può essere dato dalle costruzioni di Broscio di poligoni ad aree diverse, essendo ognuno compreso nella superficie del precedente, ma isoperimetrici.

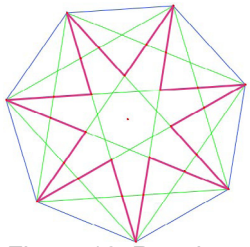


Figure 12: Regular star heptagon generated by drawing diagonals of another polygon

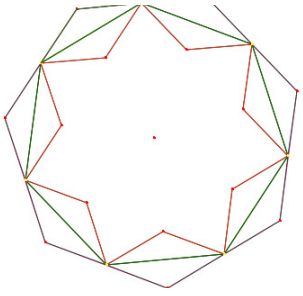


Figure 13: Heptagon of species II

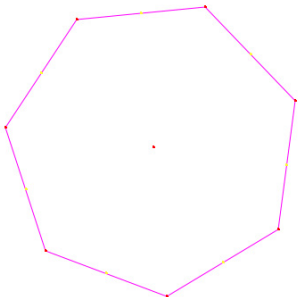


Figure 14: Convex heptagon of species I

Liceo Statale
E. Boggio Lera
Catania, Italy

Enrico Boggio Lera

by **Barbara Perillo**

Introduction

From 6th to 9th June 2012 in Catania's Boggio Lera Scientific High School there were various manifestations celebrating the 150th years by the born of the famous physicist who is entitled the school.

Enrico Boggio Lera was born in Bardonecchia, on 6th March 1862. His father, engineer, was there to build the Frejus tunnel.

After school studies, he attended the Pisa Normal High School with full marks.

When he was 23, he took a degree in Physics and Mathematics with a thesis about "Kinematics of continuum" with full marks and publication right paid by State.

In 1887 he obtained teaching in Sassari's Technical High School where he met the city's primary doctor's daughter, Virginia Manca.

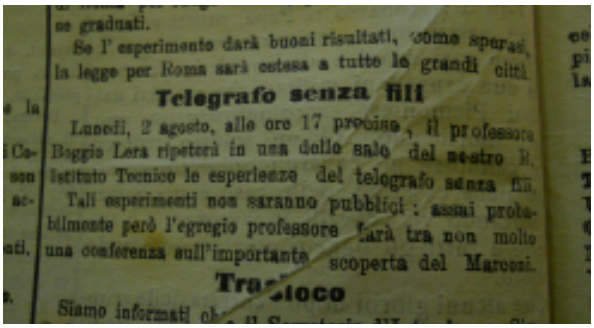
He married her and they had 7 sons.

Since 1892 he taught in Catania's Gemmellaro Technical High School; since 1893 he began teaching on the Viticulture and Oenology (now Eredia Agricultural High School) too.

After some promotions from both schools, on 1st October 1923 he had the title of "Professore del Ruolo di Onore della Pubblica Istruzione", then the one of "Cavaliere dell'Ordine della Co-

Introduzione

Dal 6 al 9 giugno 2012 presso il Liceo scientifico Boggio Lera di Catania hanno avuto luogo manifestazioni varie in occasione del 150° anniversario della nascita dell'illustre fisico a cui è intitolato il Liceo.



se graduati.
Se l'esperimento darà buoni risultati, come spera, la legge per Roma sarà estesa a tutte le grandi città.

Telegrafo senza fili

Lunedì, 2 agosto, alle ore 17 precise, il professore Boggio Lera ripeterà in una delle sale del nostro R. Istituto Tecnico le esperienze del telegrafo senza fili.
Tali esperimenti non saranno pubblici: assai probabilmente però l'egregio professore farà tra non molto una conferenza sull'importante scoperta del Marconi.

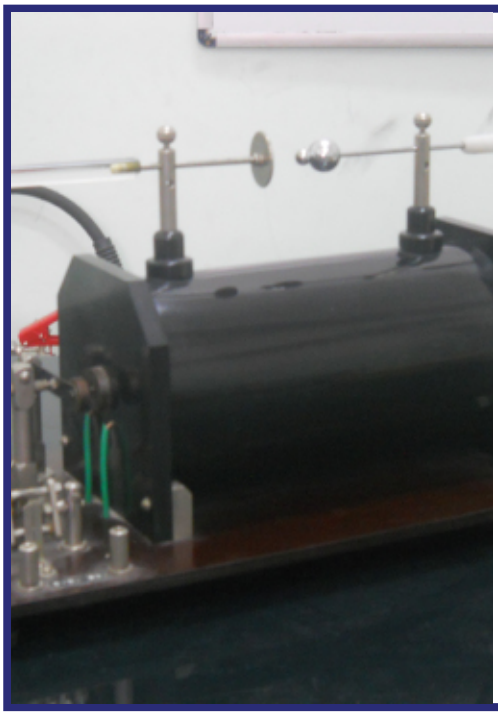
Tra...loco

Siamo informati ch...

Fig 1 *Corriere di Catania,* 31st July 1897 at *Ursino Recupero* Library in Catania.
Corriere di Catania, 31 luglio 1897 conservato presso la Biblioteca Ursino Recupero di Catania.

Enrico Boggio Lera nacque il 6 marzo 1862 a Bardonecchia (To) dove il padre, ingegnere, si trovava per i lavori di costruzione della galleria del Frejus. Finiti gli studi liceali, entrò, per concorso, alla Scuola Normale Superiore di Pisa e frequentò ottenendo eccellenti risultati. A 23 anni si laureò in Fisica e Matematica con una tesi sulla <<cinematica dei mezzi continui>> con il massimo dei voti e diritto di pubblicazione a spese dello Stato.

Nel 1887 ottenne l'insegnamento presso l'Istituto Tecnico di Sassari dove conobbe la figlia del medico primario della città, Virginia Manca, che diventò sua moglie e da cui ebbe sette figli.



Wireless Telegraphy Experience carried out by E. Boggio Lera Instruments description.
Ruhmkorff Reel
Location: Physics lab at Scientific High school Boggio Lera
Date of construction: 1930s
Snapshot
Description
Heinrich D.Ruhmkorff (Hannover 1803 – Parigi 1877),
German Physicist.
Ruhmkorff Reel belongs in the group of transformers.
Its components are:

1- A soft iron core round which two copper-thread coils are reeled, the primary and the secondary circuit;
2- The primary circuit consists of a big diameter copper thread with a small number of turns, fed by a generator;
3- The secondary, snugly isolated circuit, consisting of a thin cop per thread with a big number of turns;
4- The ends of the second circuit are connected with two elec trodes, one disc-shaped and a pointed one, that constitute the coil.

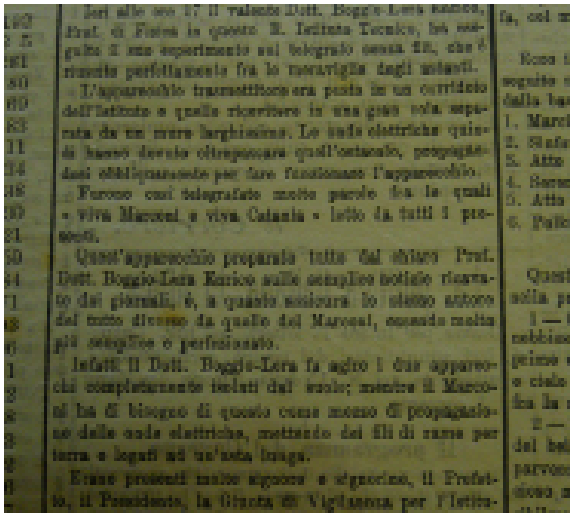


***Fig 2 Corriere di Catania,* of 3rd August 1897 at *Ursino Recupero* Library in Catania.**
Corriere di Catania, 3 agosto 1897 conservato presso la Biblioteca Ursino Recupero, Catania.

rona d'Italia" and the one of "Cavaliere Ufficiale" because of exceptional merit of teaching.

Since 1904 he taught at the Catania's University, he ended on 1932 because of pension.

He gave another help to science until 1952, when he left it because of music that he loved.

On 7th November 1956, when he was 94, he died.

The sculptor Emilio Greco build a statue in his honour, placed on the "Viale degli uomini illustri" in the Bellini Park. A square, near "Cibali" stadium, has his name.

His scientific production was various in physics and chemistry.

A lot of his publications are in "Accademia Gioenia", an other lot were lost. His book "Galileo Galilei: vita ed opere", printed by "Casa Editrice Vallardi", is very interesting.

At the school, during manifestations, were done the most important physical experiences made by Boggio Lera in Gemmellaro High School's laboratory with his own instruments.

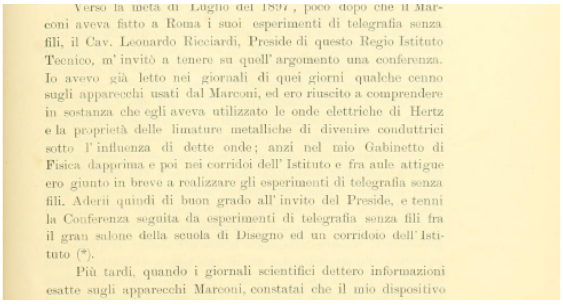
Dal 1892 la sua sede definitiva per l'insegnamento fu Catania, presso l'Istituto Tecnico "Gemmellaro"; a questo incarico si aggiunse, nel 1893, quello presso l'Istituto di Viticultura ed Enologia (oggi Istituto Agrario <<F. Eredia>>).

Da entrambi gli istituti ebbe varie promozioni per merito distinto e, l'1 ottobre 1923 fu nominato Professore del Ruolo di Onore della Pubblica Istruzione, poi Cavaliere dell'Ordine della Corona d'Italia e Cavaliere Ufficiale per eccezionali meriti di insegnamento.

Nel 1904 conseguì la Libera Docenza presso l'Università di Catania e vi insegnò fino al pensionamento avvenuto nel 1932. Continuò, però, a dare il suo valido contributo nel campo scientifico per tanti anni ancora.

Nel 1952 si ritirò e si dedicò alla musica che amava moltissimo.Il 7 novembre 1956 si spense all'età di 94 anni.

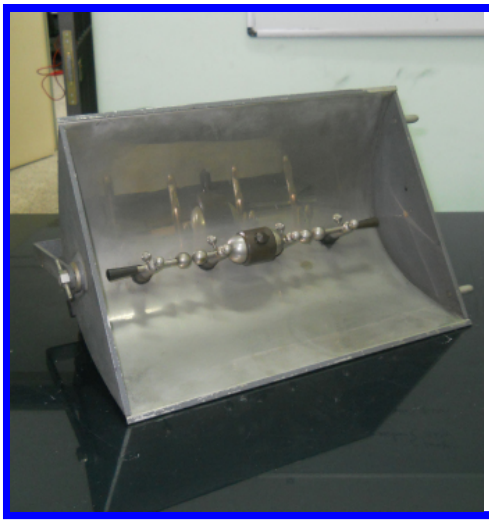
Catania lo ha onorato con un busto realizzato dallo scultore Emilio Greco, posto nel viale degli uomini illustri della Villa Bellini e con una piazza a lui intitolata nei pressi dello Stadio



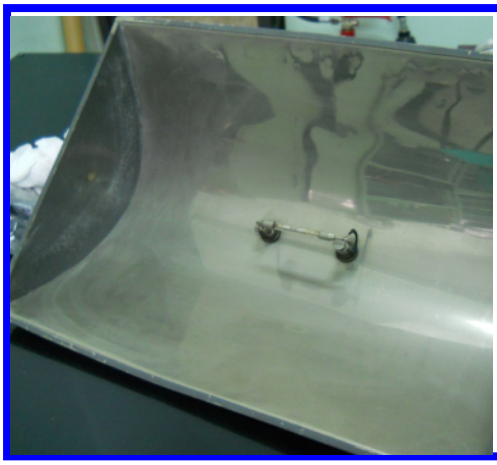
Verso la metà di Luglio del 1897, poco dopo che il Marconi aveva fatto a Roma i suoi esperimenti di telegrafia senza fili, il Cav. Leonardo Ricciardi, Preside di questo Regio Istituto Tecnico, m' invitò a tenere su quell' argomento una conferenza. Io avevo già letto nei giornali di quei giorni qualche cenno sugli apparecchi usati dal Marconi, ed ero riuscito a comprendere in sostanza che egli aveva utilizzato le onde elettriche di Hertz e la proprietà delle limature metalliche di divenire conduttrici sotto l' influenza di dette onde; anzi nel mio Gabinetto di Fisica dapprima e poi nei corridoi dell' Istituto e fra aule attigue ero giunto in breve a realizzare gli esperimenti di telegrafia senza fili. Aderii quindi di buon grado all' invito del Preside, e tenni la Conferenza seguita da esperimenti di telegrafia senza fili fra il gran salone della scuola di Disegno ed un corridoio dell' Istituto (*).

Più tardi, quando i giornali scientifici dettero informazioni esatte sugli apparecchi Marconi, constatai che il mio dispositivo

Fig 3 E. Boggio Lera's memoir about an air electricity recorder among the procedings of Accademia Gioenia of Natural Sciences in Catania.
Memoria di E.Boggio Lera "Sopra un registratore di scariche elettriche dell'atmosfera" contenuta negli Atti della Accademia Gioenia di Scienze Naturali in Catania.



Wireless Telegraphy Experience carried out by E. Boggio Lera
Instruments description.
Instruments description
B)Righi's Oscillator with parabolic reflector
Location: Physics lab at Scientific High school Boggio Lera
Date of construction: 1930s
Snapshot
Description
This oscillator was invented by Righi approximately in1894 (A. Righi Bologna 1850-1920) It is employed for generating up to few millimeter-long electromagnetic waves. It is made up of:
1- Three couples of spheres, two lateral and a central one;
2- The central couple with two spheres located a few millimeters away and partially immersed in Vaseline oil.



Wireless Telegraphy Experience carried out by E.Boggio Lera
Instruments description
Parabolic reflector coherer
Location: Physics lab at Scientific High school Boggio Lera
Date of construction: 1930s
Snapshot.
Description
The coherer was invented by the Italian physicist Calzecchi On esti (Lapedona 1853- Monterubbiano 1922). It consists of:
1- A glass tube with a diameter of few mms;
2- Two overlooking metal cylinders, inside the tube, but not in touch with one another
3- Scanty metal filing between the two cylinders

In fact, when in 1923, was founded the first Scientific High School in Catania, with authorization of the provincial administration, a lot of physical instruments, some used by him, were given by the Gemmellaro High School to the new school. That instruments were the beginning of a Physics Laboratory who grew buying new instruments.

Most of the old instruments were unused and

“Cibali”.

Vasta la sua produzione scientifica in svariati campi della fisica e della chimica. Molte sue pubblicazioni si trovano presso l’Accademia Gioenia: tante sono andate perdute. Interessantissimo il libro <<Galileo Galilei: vita ed opere>> pubblicato dalla Casa Editrice Vallardi.

Il Liceo, durante le celebrazioni del 150° an-

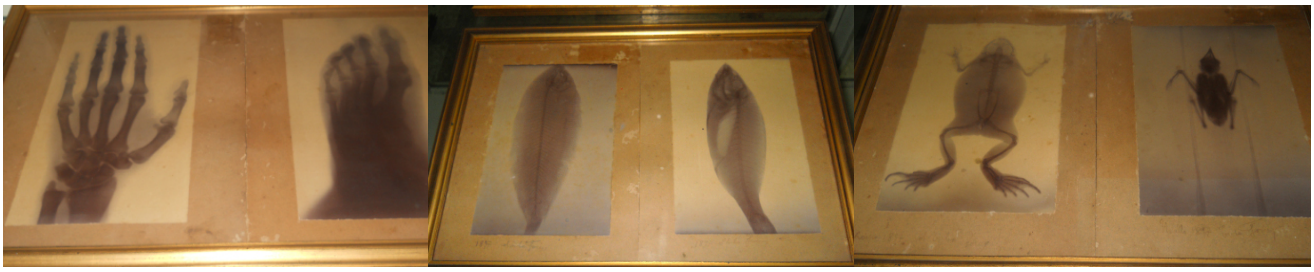


Fig 4-5-6 Some radiographs made by E. Boggio Lera at the Fernando Valvo museum of the C. Gemmellaro High School

Radiografie eseguite da E.Boggio Lera conservate presso il museo Fernando Valvo dell’Istituto di Istruzione Superiore C. Gemmellaro.

at the event were restored: a good team of teachers fixed almost 200 instruments, making them fully functional. On 8th and 9th June were shown at school to a big audience a lot of experiences, including the wireless telegraphy. Those experiences were done by Boggio Lera in July 1897 and Catania’s newspapers wrote about that on 17th, 31st July and 3rd August 1897. Those experiments were done shortly after Marconi’s ones, about which newspapers wrote in June 1897. Were shown and described to the public a lot of X rays tools built by Boggio Lera, used by him to do the first radiographies.The famous scientist was very interested by meteorology so he built a tool who notices and records storms: that tool was very wanted by meteorology stations all over the world. In 1900 he received praise mail from Paris because his instrument reported a storm 3 hours before its arrival. “Richard” factory of Paris produced and sold a lot of them.He was a big scientist, reserved, who refused honors and who didn’t

niversario della nascita, ha riproposto le più importanti esperienze di Fisica che il prof. E. Boggio Lera aveva realizzato nel Laboratorio dell’Istituto Gemmellaro. Sono stati utilizzati, per questo, alcuni strumenti su cui egli stesso aveva sperimentato! Infatti, quando nel 1923, nacque a Catania il primo Liceo scientifico, con l’autorizzazione dell’Amministrazione Provinciale parecchi strumenti di Fisica furono ceduti dall’Istituto Gemmellaro al nascente Liceo e, tra essi, anche alcuni su cui aveva sperimentato il prof. Boggio Lera. Questi strumenti servirono per creare un piccolo Laboratorio di fisica che, nel corso degli anni, andò ingrandendosi con l’acquisto di nuovi strumenti. Così alcuni strumenti antichi furono meno usati. Per la suddetta ricorrenza, si sono voluti ristrutturare: una valida “equipe” di docenti ha intrapreso questo arduo lavoro recuperando circa 200 strumenti e rendendoli perfettamente funzionanti. Dal 7 al 9 giugno si è organizzata la mostra di essi che sono stati ammirati da un folto pubblico che ha as-

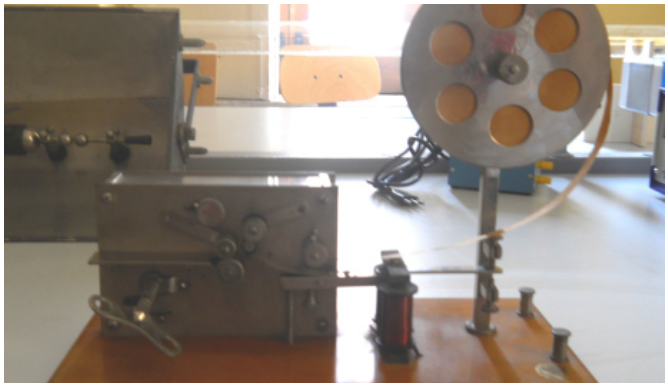


Fig 7 Morse telegraph, tool used by E. Boggio Lera in his wireless telegraphy experiments and made working by a group of students of the school, to redo the same experiments on 8 and 9 June 2012.

Registratore telegrafico Morse, strumento usato da E.Boggio Lera per le esperienze di telegrafia senza fili ed utilizzati da alcuni alunni di 1°D per eseguire le stesse esperienze nei giorni 8 e 9 giugno 2012.

use his inventions for profit.One of his students wrote: “The joy of making that, of emptying his genial heart, of thinking, only him without applause, the possible applications of his inventions, was enough for him”.One of his sons doesn’t agree with him, because he said: “In life you need to do, to can do and to notify all you can do”.

Bibliography

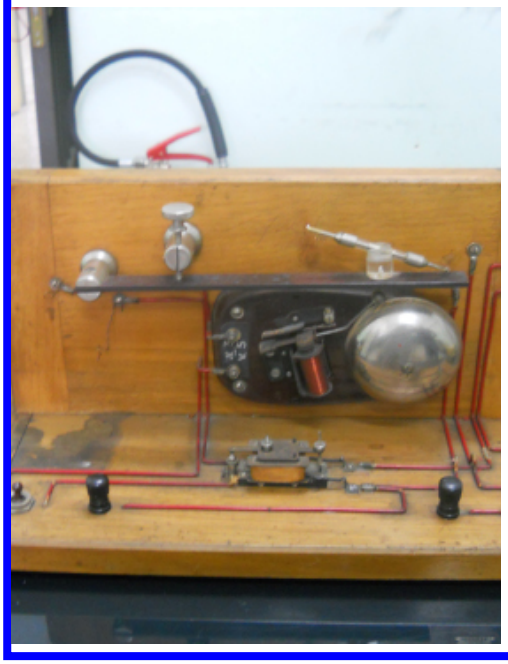
- Books consulted: Enrico Boggio Lera nella vita e nella storia (S.E.I. Printing, 1963)
- Boggio Lera: La tradizione di un Liceo (Marino typography, S. Barbara street 15, Catania, June 2001)

sistito anche alle esperienze di telegrafia senza fili così come aveva fatto il Professore nel Laboratorio dell’Istituto Gemmellaro nel mese di luglio del 1897 e di cui avevano dato notizia i giornali catanesi dei giorni del 17 e 31 luglio e del 3 agosto 1897. Tali esperimenti seguirono di poco quelli di Marconi di cui la stampa aveva dato notizia nel giugno dello stesso anno. Sono state realizzate altre esperienze, molte sui raggi X su cui il prof. Boggio Lera aveva fatto studi particolari.

L’illustre scienziato fu anche un grande studioso di meteorologia ed aveva inventato un apparecchio che segnalava e registrava i temporali: questo apparecchio fu richiesto da tanti Istituti e Stazioni meteorologiche del mondo. Nel 1900 ebbe da Parigi una lettera di encomio perché l’apparecchio da lui costruito aveva segnalato un temporale tre ore prima che questo si portasse all’orizzonte del luogo. La casa <<Richard>> di Parigi ne produsse e ne vendette parecchi. Fu un grande scienziato, riservato, restio agli onori e all’uso delle sue invenzioni per lucro. Un suo alunno di lui ha scritto: <<gli bastava la gioia di avere creato, di avere svuotato il suo cuore geniale, di pensare, lui solo e senza coro di applausi, alle possibili applicazioni delle sue invenzioni…>>.Uno dei suoi figli, però, non condivideva questa sua convinzione e soleva dire:

<<nella vita bisogna fare, saper fare, e far sapere di saper fare>>.

Wireless Telegraphy Experience carried out by E. Boggio Lera



Instruments description

Marconi’s receiver

Location: Physics lab at Scientific High school Boggio Lera

Date of construction: 1930s

Snapshot

Description

This reception wooden-supported instrument, manufactured by Officine Galileo in Florence, dates back to the Thirties.
It is a faithful reproduction of the machinery used by Mar coni (1874-1937) during his early radio broadcasting exper iments of 1895. It is employed for receiving electromagnetic signals broadcast by the transmitting device, (Righi’s Oscil lator)

The instrument is made up of two continual power-fed circuits:

1- 1st circuit: generator - Coherer – aerial input terminal – re lay coil – generator
2- 2nd circuit: generator – relay contacts – electro-magnet – keeper – screw - generator

Liceo Statale
E. Boggio Lera
Catania, Italy

iPad mini

by **Luigi LaMagna**

Fig 1 Chip A5

I chose this topic because I think it was a big step forward that Apple has done.

Let's start with the first detail, even the least important. It has a display of 7.9 "backlit LED. It has a slim design and very compact. It is often very light and 7.2 mm, 308 g. Given its restricted hold all, allows you to take it anywhere and use it freely.. But the magnitude, in this

Fig 3 Photo with iSight

case, it does not matter. The important thing is that it contains. It has a powerful A5 chip that allows the user to browse through the pages of a book, play, watch a movie much more quickly and smoothly. Furthermore, compared to the iPad, has a charge of 10 hours so as to play, to read a book to the user when and where he wants to, without worry that the battery.

Then, you can Face Time video calls over Wi-Fi or cellular network. It has a front camera in HD pointing towards you, and one on the back that shows all the things that around. Additionally, the camera in the back, iSight, has 5 megapixels and has a BSI sensor that adjusts the light. It has a Wi-fi connection much faster than the iPad, 802.11n dual-band (2.4GHz and 5GHz).

Fig 2 SIRI

Here is the news of all Apple products with iOS6: SIRI. SIRIis an innovative, first only in English now available in many other languages, which helps the user to do everything just needs to ask.

You talk to Siri as if it was a person, and Siri understands what you say and knows what to say.

Fig 4 IPad mini 2

Finally, but not less important, iCloud. iCloud is a program of sharing between all Apple devices that you own. Just log in to be able to send, manage photos, documents and more. In addition, iCloud allows you to locate your iPad mini, if you lose it, and lock it.

This is just the beginning of a great epoch of development of technology and of human knowledge.

Bibliography

http://www.apple.com/it/ipad-mini/features/

Iconography

http://www.apple.com/it/ipad-mini/features/
http://store.apple.com/it/buy-ipad/ipad-mini-2

Liceo Statale
E. Boggio Lera
Catania, Italy

Nanotech
The Present
Il Presente

by Alessandro Lagona

Introduction

Nanotechnology is a technology that manipulates the properties and structures of materials. Nanotechnologies employed often have the width of a human hair, which ranges from about 1 to 100 nanometers. Nanotechnology can be used in many fields: clothing, cosmetics, physics, chemistry, medicine, computer science. The burgeoning new field of nanotechnology, opened up by rapid advances in science and technology, creates myriad new opportunities for advancing science. The universality of nanotechnology is applied to almost every face of modern life. Thanks to nanotechnologies, human life could change in a better way. The present study reports some nanotechnology applications used in present in modern fields like medicine, ecology, technology, materials and nutrition.

A very hopeful sector in the future of nanotechnologies is medicine. Thanks to this kind it is possible to make much easier diagnoses for doctors. Today, traditional treatments of cancer affect the whole body, harming it, and not just the tumoral cells, but with nanotechnology, nano-medicine can be direclty introduced in the affected area of the patient's body, in order to not compromise other parts of the body not involved in the desease.

The researchers developed the "nanocomposites", a set of nanoparticles composed of several elements that can solve the pollution problem. The Pacific Northwest National Laboratory has discovered, for example, that these nanocomposites can absorb the toxic water if their bases are composed of silicon. In

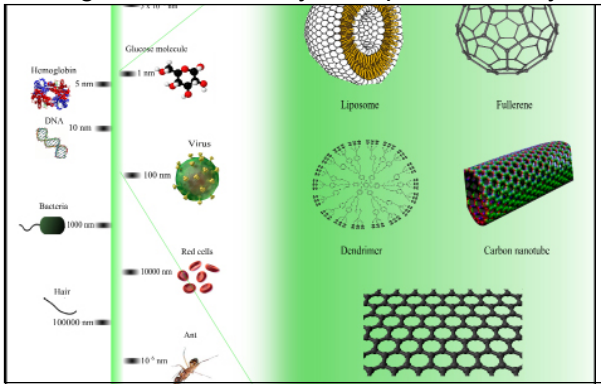


Fig 1
Nanotechnology dimensions
Dimensioni nanotecnologiche

Introduzione

Quella nano è una tecnologia che permette di manipolare proprietà e strutture dei materiali per nuove e, spesso, inaspettate caratteristiche che permettono applicazioni fino ad ora impensabili.

Le nanotecnologie spesso impiegate hanno la grandezza di un capello umano, che può variare da 1 a 100 nanometri. Le nanotecnologie possono es

sere utilizzate in vari campi come: abbigliamento, cosmetica, fisica, chimica, medicina e computer. Nel nascente campo della nanotecnologia, aperta da rapidi progressi nella scienza e nella tecnologia, si creano una miriade di nuove opportunità per far progredire la scienza. L'universalità della nanotecnologia è applicata a quasi ogni campo della vita moderna. Grazie alle nanotecnologie la vita umana potrebbe migliorare. Gli attuali studi applicano le nanotecnologie in campi moderni quali medicina, ecologia, tecnologia, materiali e nutrizione.

Un settore molto fiducioso nel futuro delle nanotecnologie è la medicina. Grazie a questo tipo di tecnologia è possibile facilitare le diagnosi per i medici. Al giorno d'oggi, i trattamenti antitumorali colpiscono ogni cellula del corpo, e non solo le cellule tumorali, ma grazie alle nanotecnologie, la nano-medicina può essere introdotta direttamente nella zona interessata del corpo del paziente; al fine di non compromettere altre parti del corpo non coinvolto nella malattia.

I ricercatori hanno sviluppato i nanocompositi, un insieme di nanoparticelle composta da diversi elementi che possono risolvere il problema dell'inquinamento. Il Pacific Northwest National Laboratory ha scoperto che questi nanocompositi possono assorbire l'acqua inquinata se le loro basi sono principalmente composte da silicio. Al fine di rimuovere il solvente chiamato TCE, le nanoparticelle, attraverso una reazione chimica, sono

order to remove the solvent called TCE (trichloroethene), nanoparticles, through a chemical reaction, are able to convert all the contamination and make it harmless. A method of deionization that uses electrodes composed of nanofibers, can remove the salt from the water: this method can use the drinking water as energy and thus reducing costs. This could be a solution to reduce the pollution of the entire ocean, which is now one of the biggest problems on the planet.Some scientists have developed a new technique for cooling computer chips, using carbon nanotubes. An experiment has been carried out where carbon nanotubes and metal surfaces were in contact, and it was discovered that flows between the two bodies is increased by six times. This means that the cooling and the efficiency of the pc is multiplied. The technique of use is made through liquid gases at low temperature which facilitates the manufacturing of covalent chemical bonds that will work with oxide-forming metals such as silicon and noble metals such as gold or copper.

in grado di convertire tutte le contaminazioni e renderlo inoffensivo. Il sistema di deionizzazione che utilizza elettrodi composti da nanofibre, può rimuovere il sale dall'acqua: questo metodo può utilizzare l'acqua potabile come energia, riducendo i costi. Questo potrebbe essere una soluzione per ridurre l'inquinamento negli oceani, uno dei più grandi problemi del nostro pianeta.

Alcuni scienziati hanno sviluppato nuove tecniche per il raffreddamento dei chip dei computer, utilizzando nanotubi di carbonio. È stato realizzato un esperimento dove i nanotubi di carbonio e superfici metalliche erano in contatto, e si è scoperto che i flussi fra i due corpi sono aumentati di sei volte. Questo significa che il raffreddamento e l'efficienza del pc è moltiplicato. Questa tecnica utilizza gas liquidi a bassa temperatura, che facilitano la produzione di legami chimici covalenti che funzionerà con i metalli formando ossidi come silicio e metalli nobili come oro o rame.

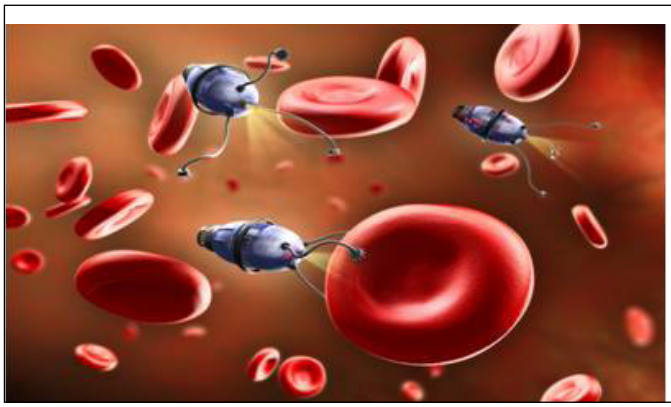


Fig 2
Possible application of nanotechnology
Possibile applicazione delle nanotecnologie

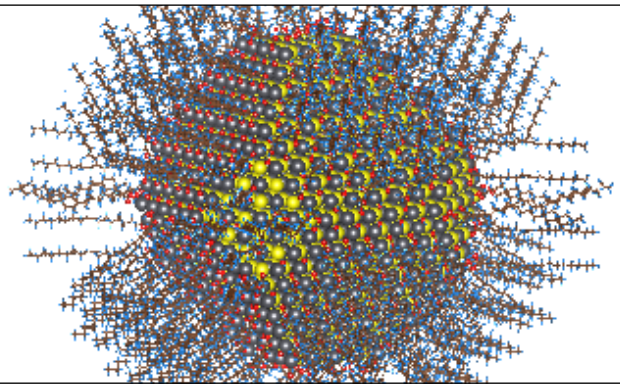


Fig 3
Semiconductor nanoparticle of lead sulfide (size ~5 nm)
Nanoparticella semiconduttrice di solfuro di piombo (~5 nm)

Scientists are getting very good results in experimenting with new fabrics resistant to stains and water and strong acids. These tissues develop a special method called LBL, "layer-by-layer". This method exploits the layers alternating positive and negative charges of materials that are held together by electrical charges. In this way, it is possible to use various goals depending on the use you intend to make. Furthermore, some laboratory tests have shown that this coating applied to cotton has been able to become impermeable to substances such as acids, bases and organic solvents.

Gli scienziati stanno ottenendo ottimi risultati nella sperimentazione di nuovi tessuti resistenti alle macchie, all'acqua e agli acidi forti. Questi tessuti sviluppano un metodo speciale chiamato LBL, letteralmente strato per strato. Questo metodo sfrutta materiali composti da strati di cariche positive e negative. In questo modo è possibile utilizzare metodi diversi a seconda dell'utilizzo che si intendete fare. Inoltre, alcuni test di laboratorio hanno dimostrato che questo rivestimento

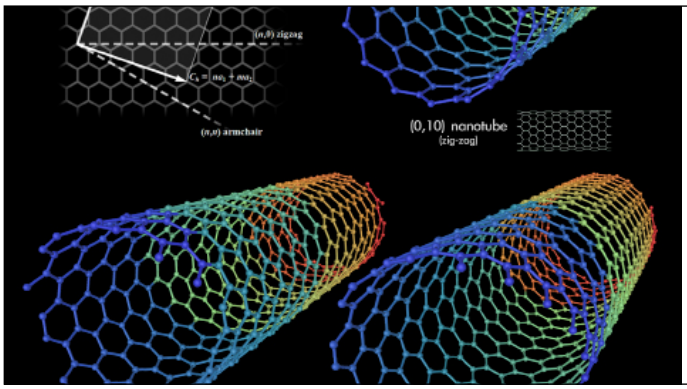


Fig 4
Structures of carbon nanotubes
Struttura di nanotubi di carbonio

Another feature of this tissue is the great strength it has. Some scientists have wanted to develop a way to stabilize these layers with UV light to form a coating that uses natural surface forces to repel water and other materials.Nanotechnology, as we have seen, is involved in all areas, including food. Researchers have begun to address this area for the potential applications in foods and nutraceuticals. These applications include new methods and mechanisms involved in the engineering of nonmaterials to target the delivery of bioactive compost and micronutrients. Biological molecule have been designed in the laboratory, with functions other than those they have in nature, opening up a new area of research and development. These technologies release efficiency of active ingredients compared to other traditional wraparound agents. This has allowed the development of nano-emulsions, liposomes, micelles, polymeric complexes led to improve the properties of the bioactive compounds protection, controlled delivery systems, food matrix integration and masking of undesired flavors.

Conclusion

Supporters of nanoscience and nanotechnology claim that this transformative field could radically alter fundamental aspects of our global society. If the research is organized in an effective way, the pursuit of these larger social and environmental goals could also help improve the conditions of the least-developed countries. Among all the benefits promised by nanoscience and nanotechnology, the potential to raise the quality of science and technology on a global scale may be the most important benefit of all.

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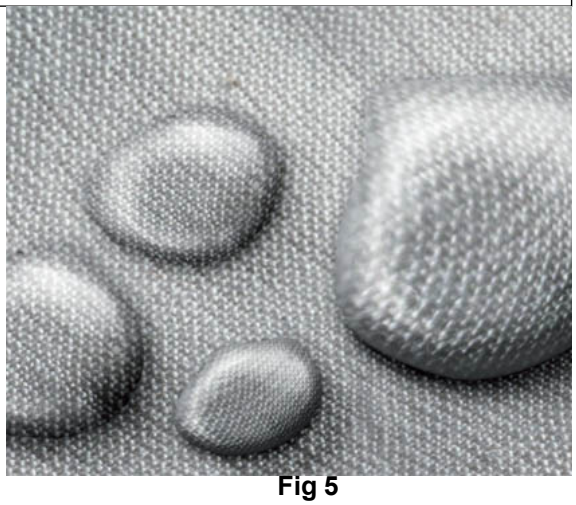

Fig 5
Nanotechnology in oil repellent, stain-resistant materials
La nanotecnologia dei materiali oleo repellenti e antimacchia

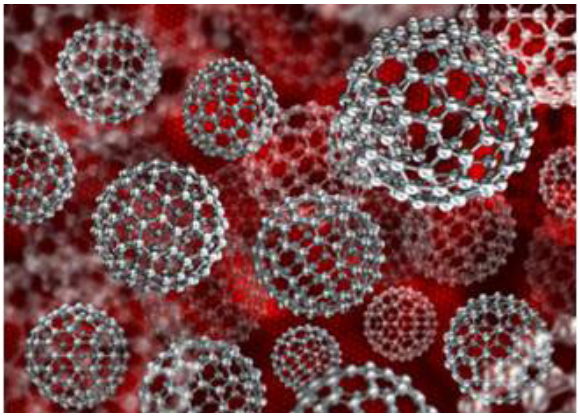

Fig 6
Nanoparticles releasing active ingredients
Nanoparticelle che rilasciano ingredienti attivi

applicato al cotone diventa impermeabile alle sostanze quali acidi, basi e solventi organici.

Un'altra caratteristica di questo tessuto è la grande forza che ha. Alcuni scienziati hanno voluto sviluppare un modo per stabilizzare questi strati con la luce, in modo da formare un rivestimento che utilizza la

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superficie naturale delle forze per respingere l'acqua e altri materiali.

La nanotecnologia, come abbiamo visto, è coinvolta in tutti i settori, compreso quello del cibo. I ricercatori hanno iniziato ad affrontare questo settore attraverso potenziali applicazioni per alimenti funzionali e nutraceutici. Queste applicazioni includono nuovi meccanismi coinvolti nell'ingegneria dell'immateriale per indirizzare la consegna dei composti bioattivi e micronutrienti. Essi sono stati progettati in laboratorio, e sono molecole biologiche con funzioni diverse da quelle che hanno in natura che aprono ad una nuova area di ricerca e sviluppo. Queste tecnologie garantiscono un'efficienza di ingredienti attivi rispetto ad altri agenti avvolgenti tradizionali. Ciò ha permesso lo sviluppo di nano-emulsioni, liposomi, micelle, polimerici complessi, portati a migliorare le proprietà dei composti bioattivi, tutela di sistemi di erogazione controllate, integrazione di matrice alimentare e mascheramento di sapori indesiderati.

Fig 7
Handling Nanomaterial in a lab
Manipolazione di nanomateriali in laboratorio

Conclusioni

I sostenitori della nanoscienza e della nanotecnologia sostengono che questo campo trasformativo potrebbe radicalmente modificare aspetti fondamentali della nostra società. Se la ricerca è organizzata in modo efficace, il perseguimento di questi obiettivi sociali e ambientali potrebbe aiutare a incentivare le risorse delle nazioni meno sviluppate.

Tra tutti i benefici promessi dalla nanoscienza e dalla nanotecnologia, la prospettiva di migliorare la qualità delle scienze su scala globale può essere il vantaggio più importante di tutti.

Colegiul Tehnic
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Organic nanomaterials used in Cosmetics

Nanomaterialele utilizate in produsele cosmetice organice

by Madalina Trepadus, Ana Ghimp

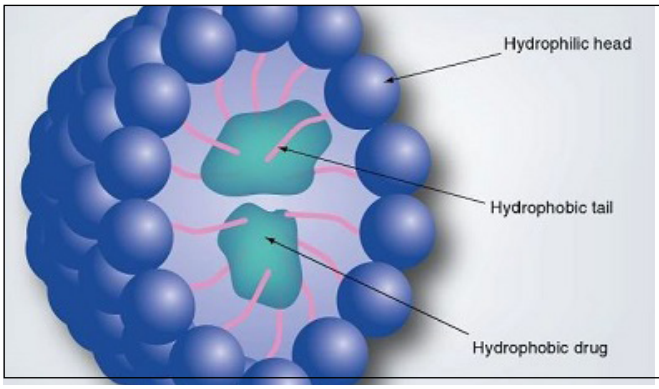

Fig 1
Niosome
Niozom

Introduction

Nano cosmetics is a modern area with a particular interest for researchers because nano materials are offering new advantages compared to bulk materials. World customers are looking for care products that supply multiple benefits with minimal efforts and fewer side effects.

In this article, I have chosen to write and emphasize some organic substances that are often used as nanocosmetics, their ingredients being found nowadays or in the short future in deodorizers, soaps, toothpaste, shampoo, hair conditioner, anti-wrinkle creams, moisturizers, foundation, face powder, lipsticks, blush, eye shadow, nail polish, perfume, after-shave lotion, etc. These types of organic ingredients are liposomes, niosomes and nanoemulsions.

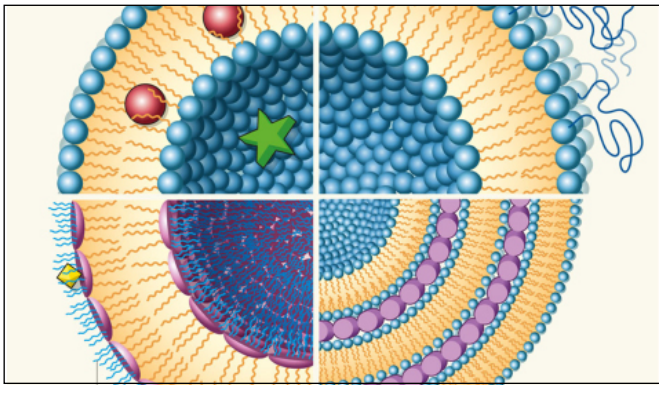

Fig 2
Liposome
Lipozom

Recent research & results

Cosmetics are products created for body care having the effect of cleansing, beautifying or hiding defects and enhancing beauty features, to balance or intensify the odour of the human body. Reaching

Introducere

Un interes deosebit în actualul secol îl reprezintă nanocosmeticele, cercetătorii fiind captivaţi de multifuncţionalitatea acestora şi de costurile relativ reduse de sinteză, în aplicaţiile diverse ale profilaxiei sănătăţii corpului uman, tratării disfuncţiilor acestuia sau ascunderii defectelor prin evidenţierea aspectelor pozitive.

Acest articol îşi propune să exploreze şi să evidenţieze tipurile de substanţe organice utilizate de nanotehnologie în cosmetică, adică cele care intră în compoziţia unor deodorante, săpun, pastă de dinţi, balsam de păr, creme hidratante, fonduri de ten, pudră de faţă, lacuri de unghii, parfumuri, loţiuni după ras, cele mai performante fiind lipozomii, niozomii şi nanoemulsiile.

Cercetare si rezultate recente

Performanţele dorite de cercetători pentru nanocosmetice sunt cele care asigură transportul transdermic, penetrând eficient straturile pielii şi ajungând la celulele cutanate, limitând totodată trecerea lor în circuitul sanguin.

Mitkare şi colaboratorii afirmă că există două clase de nanoparticule utilizate ca ingrediente active în produsele cosmetice: nanoparticule organice labile ca lipozomi, niozomi, nanoemulsii și nanoparticule anorganice insolubile, cum ar fi dioxidul de titan, fulerene, puncte cuantice, etc.

Anuradha şi colaboratorii dau o definiţie accesibilă lipozomilor şi niozomilor.

Astfel, lipozomii sunt vezicule globulare care au la bază molecule amfifile ce îmbunătăţesc permeabilitatea ingredienţilor activi la nivelul pielii, respec-

the cutaneous cells is one of the main concerns of cosmetics, at the same time limiting the passage into blood vessels. Like cosmetics, cosmeceuticals contain ingredients which contribute to the biological function of the skin and are topically applied.

tiv să acţioneze ca medicament sau purtători de cosmetice.

Niozomii (Fig.1, Niozom) sunt varianta sintetică a lipozomilor.

O definiţie mai consistentă a lipozomilor (Fig.2, Lipozom) ar fi aceea că reprezintă vezi-

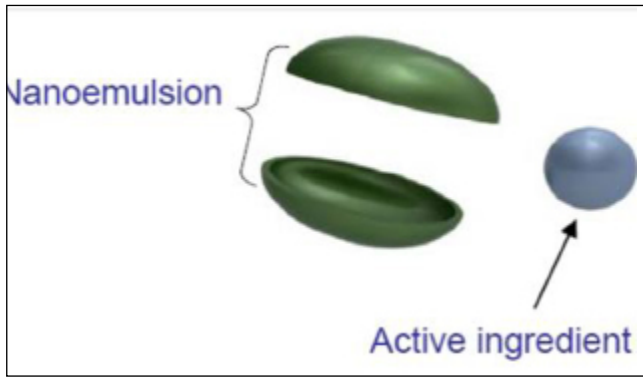

Fig 3
Nanoemulsion
Nanoemulsii

Mitkare et al. stated that there are two groups of nanoparticles used as active ingredients in cosmetics: labile organic nanoparticles as liposomes, niosomes, nanoemulsions, and insoluble inorganic nanoparticles like titanium dioxide, fullerenes, quantum dots, etc.

Anuradha et al. gave a definition of affordable organic ingredients commonly found in nanocosmetics like liposomes and niosomes. Thus, Niosomes (Fig.1.Niosome) and Liposomes (Fig.2. Liposome) (synthetic variant of liposomes) are globular vesicles and are composed of amphi-

cule globulare cu un centru apos înconjrat de o membrană lipidică bistrat hidrofobă formată din colesterol şi fosfolipidă.

Fosfolipida reprezintă o moleculă de glicerol, esterificată cu 2 acizi grași și o grupă fosfat. Niozomii sunt nanostructuri cu diametrul între 100 nm şi 2 μm, a căror centru este o cavitate apoasă înconjurată de straturi de surfactant neutru cu structură lamelară.

Niozomii sunt utilizaţi pentru a încapsula solvaţi apoşi.

Partea hidrofobă este protejată de solven-

Fig 4
Lancôme Hydra Zen
Lancôme Hydra Zen

philic molecules which enhance the permeation of active ingredients across the skin and act as drug and cosmetics carriers, respectively. Liposomes are vesicular structures made up of a very-aqueous core surrounded by a hydrophobic membrane composed of a lipid bilayer photospholid and cholesterol. Liposomes are generally utilized in aqueous systems. Liposomes are used in the cosmetic industry because of the ease of processing and application. Reshmy Rajan et al. published about a new type of liposomes called, transfersomes which are more elastic than liposomes and have improved efficiency. The niosome is a nanostructure enveloped by layers of nonionic surfactant in

tul apos, în timp ce grupele principale hidrofile sunt în contact cu acesta.

Avantajele utilizării niozomilor în cosmeticele pentru îngrijirea pielii includ stabilitatea lor, toxicitatea redusă, permeabilitatea ridicată, ceea ce a condus la eficienţa acestora ca purtători de agenţi antiinflamatori şi antiinfecţioşi.

Reshmy Rajan şi colaboratorii au publicat recent un studiu în legătură cu un nou tip de lipozomi numiţi transferozomi, care sunt mult mai elastici decât primii, crescând eficienţa în aplicaţii diverse ale îngrijirii pielii.

cum ar fi apa, uleiurile şi surfactanţii. Com-

lamellar phase. Being non-ionic surfactant vesicles, niosomes can be used to encapsulate aqueous solutes. The hydrophobic parts are shielded from the aqueous solvent while the hydrophilic head groups are in contact with it. The advantages of using niosomes in cosmetics and skin care include stability and low toxicity, as they are used for the delivery of anti-inflammatory and anti-infective agents.

Nanoemulsions (Fig.3. Nanoemulsion) are used in certain cosmetic products such as lotions or conditioners combining such as water, oils and surfactants. Compared with microemulsions, they are very fragile systems. Thus, because of their sensory properties and biophysics, nanoemulsions are easily evaluated in skin care. Nanoemulsion lotions allow milk, crystal clear transparent gels with different rheological behavior, richness and surface features.

Few examples of skin care suppliers worldwide are revealing their interests for nanocosmetics applications: Lancôme Hydra Zen Cream (Fig.4. Lancôme Hydra Zen) is using “nano-encapsulated Triceramide to renew skin’s healthy look”; L’Oreal Revitalift Double Lifting (Fig.5. L’Oreal Revitalift) anti-wrinkle cream is the “first double-action cream that instantly re-tautens the skin and reduces the appearance of wrinkles”, and contains Niosomes of Pro-Retinol A.

Nanoemulsions are used in preserving ingredients like vitamins and antioxidants. Solid lipid nanoparticles acts as a UV blocker, thus improving UV protection combined with organic sun-

parativ cu microemulsiile, nanoemulsiile se află într-o stare metastabilă şi sunt sisteme deosebit de fragile, având proprietăţi senzoriale şi biofizice avansate.

Nanoemulsiile sunt utilizate pentru a conserva şi menţine stralucirea şi transparenţa substanţelor active ca, de exemplu, vitaminele, antioxidanţii etc.

Lancôme Hydra Zen Cream (Fig.4, Lancôme Hydra Zen) şi L’Oreal Revitalift Double Lifting anti-wrinkle cream (Fig.5, L’Oreal Revitalift) sunt doar două dintre produsele de pe piaţa cosmeticelor care propun efecte uimitoare prin folosirea nanoparticulelor cu

Fig 5
L’Oreal Revitalift
L’Oreal Revitalift

Fig 6
Skin cream
Creama pentru piele

triceramidă, respectiv cu Pro-Retinol A.

Concluzii

Se desprinde din cele prezentate în acest studiu că nanocosmeticele organice induc avantaje clare pentru întreţinerea frumuseţii şi sănătăţii pielii (Fig.6, Crema pentru piele) dacă problemele legate de stabilitate, acces în adâncime la nivelul straturilor pielii, toxicitate, protecţie faţă de agenţii de stress, radiaţii UV, biocompatibilitate sunt rezolvate de către cercetători.

Astfel, nanotehnologia este inevitabil prezentă în domeniul cosmeticelor fiind la ora actuală considerată cea mai performantă tehnologie, având la bază teorii bio-fizico-chimice de natură cuantică.

screens such as benzophenone which reduces the concentration of UV absorption.

Conclusions

In conclusion, it has been discovered that organic nanocosmetics produce clear advantages in beauty care or dermatological treatments (Fig.6. Skin cream) of our body when stability, deeper skin access, toxicity, skin permeation, safe guard against UV radiation and biocompatibility of active organic nanoparticles are resolved within research community. Nanotechnology is inevitably present in the cosmetic field and is believed the highest technology available.

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The History of Nanotechnology

Istoria Nanotechnology

by Sorina Pavel

Introduction

What is nanotechnology and when did it origi nate?

It has been shown that nanotechnologies are developments in other disciplines of engineering materials (such as film technology).

Even if the term nanotechnology is relatively new, it is actually an umbrella term that encompasses disciplines with ancient historical roots.

Fig 1
Richard Feynman

Currently, researchers study the old meaning of the unknown which turns out to be composed mostly of nanoparticles.

So nanotechnologies exist and have existed around us in nature since forever.

In a narrow sense, nanotechnology is a technology based on the ability to build complex structures at the atomic level and the specifications using mechanical synthesis.

Fig 2
Eric K. Drexler

Nanoscale structures are not only very small, reaching even the atomic scale in their design, but they have some totally different and unexpected properties compared to traits of the same substance taken macroscopically.

Introducere

Ce este nanotehnologia și când a luat ea naștere?

Chiar dacă termenul nanotehnologie este relativ nou, acesta este, de fapt, un "termen umbrelă", care cuprinde discipline cu rădăcini istorice foarte vechi. Actualmente, cercetătorii au la dispoziţie mijloacele de studiu necesare pentru cercetarea diverselor artefacte care s-au dovedit a fi alcătuite în majoritatea cazurilor din nanoparticule. Așadar, nanotehnologiile există și au existat în jurul nostru, în natură, dintotdeauna.

Într-un sens restrâns, nanotehnologia are la bază abilitatea de a construi structuri complexe alcătuite din particule de nivel atomic prin sinteză fizică sau chimică. Structurile nanometrice nu numai că sunt extrem de mici, ajungându-se chiar până la scară atomică în proiectarea lor, dar ele posedă unele proprietăți total deosebite și neașteptate, în comparație cu trăsăturile aceleiași substanțe de dimensiune macroscopică.

Geneza nanotehnologiei ca știință

La 29 decembrie 1959, laureatul Premiului Nobel, Richard Feynman, a făcut pentru prima dată referire la nanotehnologie și avantajele încă neexploatate ale miniaturizării, spunând că: "Principiile fizicii, în măsura în care eu le pot vedea, nu se opun posibilității de manevrare a lucrurilor atom cu atom". Astăzi, există instrumente care urmăresc cu precizie ceea ce Feynman a zis: crearea structurilor, manevrând

The genesis of nanotechnology as a science

On December 29, 1959, Nobel prize Richard Feynman, made the first reference to nanotechnology and untapped advantages of miniature, saying: The principles of physics, to the extent that I can see, do not speak against the possibility of handling things atom by atom.

Today, there are tools that track precisely what Feynman said: creating structures moving atoms one by one.

This vision of the American physicist is considered to be the first discussion about nanotechnology and as late as 1974, Norio Taniguchi of Tokyo University accepts the term nanotechnology.

For another 10 years, nanotechnology remained away from public knowledge.

In 1986, American Eric K. Drexler wrote Engines of Creation: the coming era of nanotechnology , a book that is considered the core of nanotechnology, a field that will radically change in a few decades all sides of life's fundamental humanity

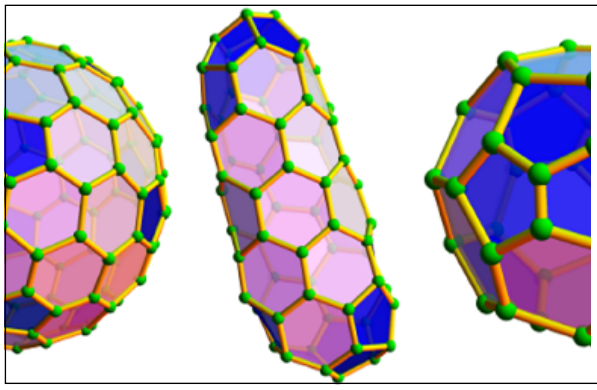

Fig 3
Fullerenes
Fulerena

While Eric was writing his book, a group of researchers at Rice University studied a molecule artifact. After several physical and chemical processes done on this molecule, Richard

Smalley and his team noticed that the carbon formed highly stable crystal composed of six atoms.

They saw how the crystals share a structure known as football and called the discovery fullerene or buckyball.

Buckyball remains the most important dis-

atomii unul câte unul. Această viziune a fizicianului american este considerată ca fiind prima discuție depre nanotehnologie, dar abia în anul 1974 Norio Taniguchi, cercetător la Universitatea din Tokio, implementează concret termenul de "nanotehnologie".

Pentru încă 10 ani, nanotehnologia a rămas departe de cunoașterea publicului. În anul 1986, americanul Eric K. Drexler a scris "Engines of Creation: the coming era of nanotechnology", carte care este considerată cursul de bază al nanotehnologiei, domeniu care va schimba radical in câteva decenii toate laturile fundamentale ale vieții omenirii. (Fig. 1, Richard Feynman), (Fig. 2, Eric K. Drexler).

În timp ce Eric își scria cartea, un grup de cercetători de la Universitatea Rice au studiat o moleculă artefactă. După mai multe procese fizice și chimice făcute asupra acestei molecule, Richard Smalley și echipa sa au observat cum carbonul a format cristale extrem de stabile alcătuite din șase atomi. Aceștia au sesizat cum

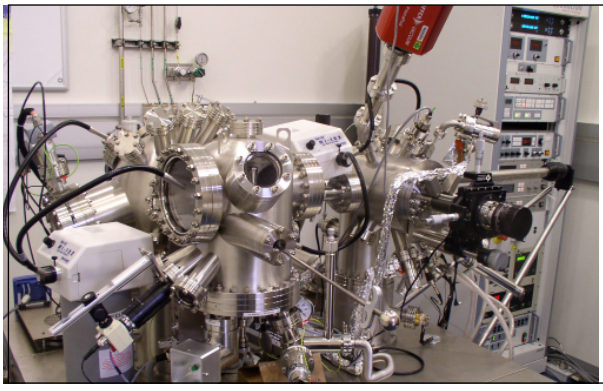

Fig 4
Scanning Tunnelling Microscope (STM)
Microscop cu Scanare Tunel

cristalele formează o structură similară cu o "minge de fotbal" și au denumit această descoperire "fullerene" sau "buckyball".

"Buckyball" rămâne cea mai importantă descoperire a nanotehnologiei. Această descoperire a dus la câștigarea Premiului Nobel în Chimie, în anul 1996, de către Smalley și colegii săi (Fig. 3, Fullerene).

Un alt pas spre dezvoltarea nanotehnologiilor îl constituie inventarea a două instrumente care au revoluționat vizualizarea și manipularea suprafețelor la scara nanometrică. Aceste două

covery of nanotechnology.

This discovery led to the winning of a Prize award in Chemistry in 1996 for Smalley and colleagues.

Another step towards the development of nanotechnology is the invention of two tools that have revolutionized the visualization and manipulation of nanoscale surfaces.

These two findings are: Scanning Tunnelling Microscope (STM) and Atomic Force Microscope (AFM) which are able to illustrate surface atomic resolution.

Binning and his collaborators at IBM Zurich are the inventors of instruments, for which they were rewarded in 1986 with the Nobel Prize for Physics.

descoperiri sunt: Scannimg Tunelling Microscope (STM) și Atomic Force Microscope (AFM), dispozitive complexe, capabile de a fotografia suprafețe cu rezoluție atomică.

Binning și colaboratorii săi de la IBM Zurich sunt inventatorii celor două instrumente, pentru care au fost recompensați, în anul 1986, cu Premiul Nobel pentru Fizică. Inventarea acestor instrumente a deschis practic porțile "lumii nano" pentru oamenii de știință. În septembrie 1989, cercetătorul Don Eigler, de la IBM, a reușit pentru prima dată în istorie să deplaseze și să controleze un atom individual, iar în noiembrie 1989, împreună cu echipa sa, a scris cuvântul IBM, utilizând 35 atomi de xenon poziționați cu precizie nanometrică.

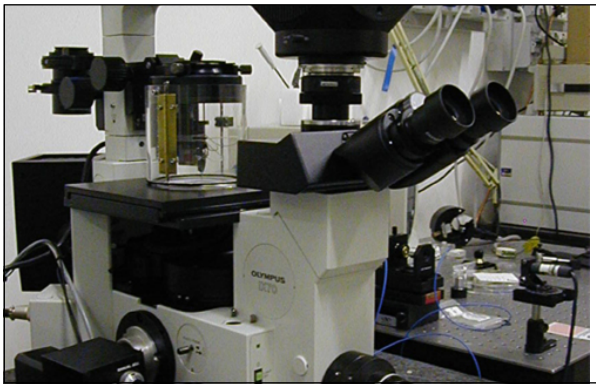

Fig 5
Atomic Force Microscopy (AFM)
Microscop cu Forta Atomica

The invention of these tools basically paved the way of nano world to scientists.

In September 1989, researcher Don Eigler, IBM Fellow, managed for the first time in history to move and control an individual atom, and in November 1989, his team wrote the word IBM using 35 xenon atoms positioned with nanometer precision.

Sumio Iijima discovered carbon nanotubes in 1991 which became a field of research valorous chemistry and molecular physics.

Carbon nanotubes are allotropes of carbon with cylindrical nanostructure and unusual properties not only in nanotechnology but also in electronics and optics.

Nanotechnology older than nanoscience.

Even if nanotechnology was introduced in 1959 as a science, there is evidence that the use of nanoparticle manipulation goes back to 2000 years ago: Damascus swords, Lycurgus cup, Ajanta paintings, traditional Indian cosmetic Kajal.

Metal colloids are the best examples of nanotechnology during the medieval and modern age.

The color of these nanoparticles is influenced by their shape and size.

These metal colloids dates back to the fifth century. The proof of their existence since that time is a Roman paper glass, Lycurgus' cup,

Saumio Iijima a descoperit, în anul 1991, nanotuburile de carbon care au devenit un câmp de cercetare valoros pentru chimia și fizica moleculară. Nanotuburile de carbon sunt alotropi ai carbonului cu nanostructură cilindrică și au proprietăți electrice şi optice neobișnuite Nanotehnologia mai veche decât nanoștiința

Chiar dacă nanotehnologia a fost introdusă ca știință în anul 1959, există dovezi ale utilizării tehnologiei pentru manipularea nanoparticulelor încă de acum 2000 de ani: săbiile de Damasc, cupa Lycurgus, picturile Ajanta, tradiționalul produs cosmetic indian kajal.

Coloizii metalici sunt cele mai bune exemple ale nanotehnologiei din timpul medieval și modern. Culoarea acestor nanoparticule este influențată de forma și dimensiunea lor. Acești coloizi metalici datează încă din secolul al V-lea. Dovadă a existenței lor încă din acea perioadă este o lucrare Romană, Lycurgus cup (cupa Lycurgus), din sticlă, având pictată o scena cu regele Lycurgus al Traciei. Putem observa că, atunci când ea este iluminată din exterior ea are culoare verde, iar când este iluminată din interior are culoarea roșu rubiniu, cu excepția regelui care are culoare violet. Misterul acestei variații de culori a fost rezolvat abia în 1990, când cercetătorii din Anglia au analizat fragmente la microscop și au constatat că acestea sunt nanoparticule de argint și aur impregnate în sticlă.

with a depiction of a scene involving King Lycurgus of Thracia.

We can see that when this work is illuminated from the outside it is green and when it is illuminated from within it gives a ruby red color, except the king who is purple.

The mystery of the variations of colours was not solved until 1990 when researchers in England analysed microscopical fragments and found that there were silver and gold particles embedded in the glass.

Another example of the existence of these colloids is the amazing stained glass made in The Middle Ages and also today in many churches. These windows are made of a composition of glass and metal particles.

If we look back to the past and the history of science, since the late nineteenth century gold colloids have been a topic of research.

The scientist who conducted systematic studies on the properties of metal colloids, especially those made of gold, was Michael Faraday who presented his paper to the Royal Society of London, in 1857.

He described a process of color change, claiming that if a gold colloid salt is added it changes color in blue.

The marvellous material represented by carbon nanotubes discovered in 1991 was used 2000 years ago in India to manufacture the famous Damascus' swords that were famous for their impregnated carbon steel, hard and flexible at the same time.

The history of materials engineering shows many examples of nanomaterials.

Over time such materials have unwittingly been produced but have not been characterized as nanoscale because they did not have the necessary tools.

For example, the anodizing was first used in the early 1930s as one of the most important processes used in industry to protect aluminum from corrosion.

The inventors of this technique were not aware that what protects the aluminum is actually a latest nano material device.

Other known examples are found in the structure of nanoparticles rubber tires, titanium dioxide found in some latest sunscreen products, many synthetic molecules used in compounding drugs etc.

Conclusion

Since the most ancient times, craftsmen and artisans have unconsciously used the techniques of manipulation of atoms and the particles obtaining the tools/products of the highest quality rediscovered only in the second half of the 20th century

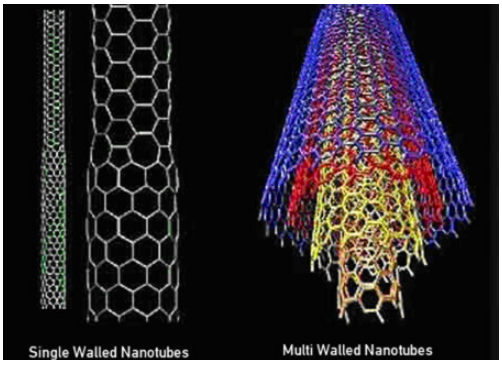

Fig 6
Carbon nanotubes
Nanotuburi de carbon

Un alt exemplu al existenței acestor coloizi îl reprezintă uimitoarele vitralii datate încă din Evul Mediu și prezente astăzi în numeroase biserici. Aceste vitralii sunt realizate dintr-o compoziție din sticlă și particule metalice.

Dacă ne întoarcem în trecut și privim în istoria științei, încă de la sfârșitul secolului al XIX-lea, coloizii de aur au reprezentat un subiect de cercetare. Omul de știință care a realizat studii sistematice cu privire la proprietățile coloizilor metalici, în special a

Fig 7
Lycurgus cap
Cupa Lycurgus

celor din aur, a fost Michael Faraday care, în 1857, și-a prezentat lucrarea la Societatea Regală din Londra. Acesta a descris un proces de schimbare a culorii, susținând că, dacă unui coloid de aur i se adaugă o anumită sare, acesta își schimbă culoarea în albastru. Miraculosul material reprezentat de nanotuburile de carbon, descoperite în 1991, s-a utilizat încă de acum 2000 de ani, în India, pentru fabricarea vestitelor săbii de Damasc, care erau renumite pentru oțelul impregnat cu carbon, greu și flexibil în același timp

Istoria ingineriei materialelor cuprinde foarte multe exemple de nanomateriale. De-

with the advent of nanoscience.

Currently, nanotechnology affects people's lives more than any scientific discovery with applications in all areas and techniques. Nanotechnology has a number of general areas: medicine, environment, cosmetic, electronic technology, household appliances, etc.

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Fig 8
Damascus swords
Sabii de Damasc

a lungul timpului, aceste nanomateriale au fost produse din neatenție si nu au fost caracterizate la scară nanometrică, deoarece nu au avut instrumentele necesare. De exemplu, procesul de anodizare a fost folosit pentru prima dată la începutul anilor 1930, reprezentând unul dintre cele mai importante procese folosite în industrie, pentru a proteja aluminiul de coroziune. Inventatorii acestei tehnici nu au fost conștienți că ceea ce protejează aluminiul este, de fapt, un nanomaterial de ultimă generație.

Alte exemple cunoscute sunt: nanoparticulele care se găsesc în structura anvelopelor de cauciuc, dioxidul de titan care se găseşte în unele produse de protecție solară de ultimă generație, numeroase molecule sintetice folosite în compoziția medicamente etc.

Concluzie

Încă din cele mai vechi timpuri, meșteșugarii și artizanii au utilizat tehnici de manipulare a atomilor fără a conştientiza obținerea de materiale de o calitate superioară redescoperite abia în a doua jumătate a secolului al XX-lea, când s-au pus bazele nanoștiinței.

În prezent, nanotehnologia influențează viața oamenilor mai mult ca orice descoperire științifică prin aplicațiile din toate domeniile și tehnicile. Nanotehnologia prezintă o serie de domenii generale: medicină, mediul înconjurător, cosmetice, tehnologie electronică, aparatură de uz casnic etc.

Acknowledgments

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Nanotech: The future

Il futuro

by Constantin-Alin Grigore, Guglielmo Aprile

Introduction

In this presentation we talk about our research, concerning the future of nanotechnology. Applications of nanostructures and nanomaterials in our everyday life.

Let's imagine that one day we will be able to fly without having wings or any particular engine, maybe that day we will be able to get on the Moon just by taking the space elevator.

Let's just imagine that our body will be able to take care of itself, from the usual, common and well known cold to the rarest, most complicated and feared diseases such as cancer without the help of drugs and doctors. All this will be possible by using the nanites and nanomaterials. Imagine that everything will be different than now.

Tools

We have worked consulting many web pag-

Introduzione

Questo articolo affronta il tema delle nanotecnologie, soffermandosi sulle nanostrutture e sulle loro possibili applicazioni future, sicuramente in grado di condizionare la nostra vita.

Un giorno saremo forse in grado di volare senza avere ali o l'ausilio di un qualsiasi meccanismo; probabilmente quel giorno riusciremo a raggiungere la Luna tramite un ascensore spaziale. Immaginiamo che il nostro corpo un giorno riuscirà a prendersi cura di se stesso per prevenire qualunque tipo di malattia, dalle più semplici alle più rare. Tutto ciò potrà essere possibile grazie all'uso delle nanotecnologie. Immaginiamo che tutto sarà diverso da ora.

Strumenti

Abbiamo lavorato consultando diversi siti web, libri e articoli. Grazie alla collaborazione con la Facoltà di Ingegneria Chimica e di Scienze Ambientali Gh. Asachi di Iaşi abbiamo avuto accesso a Science Direct, sito web di divulgazione scientifica; in Italia abbiamo avuto l'opportunità di visitare il Dipartimento di Scienze Chimiche dell'Università di Catania, dove alcuni ricercatori ci hanno mostrato le loro modalità di lavoro, i loro strumenti di ricerca e diversi esperimenti

Figure 1. Richard Fayman

Cosa sono le Nanotecnologie

Nel 1965 Richard Feynman, ricevendo il Premio Nobel per la Fisica per il suo fondamentale lavoro in elettrodinamica quantistica, ebbe una brillante idea che portò ad una nuova era nel mondo della fisica (Fig.1). Egli pronunciò la frase che poteva descrivere perfettamente il modo in cui gli scienziati del tempo guardavano al mondo intorno a loro, fermandosi al livello macroscopico: There is plenty of room at the bottom (C'è molto spazio in fondo alla materia). Stava parlando dei nanomateriali. Grazie alla sua intuizione oggi ci sono molti scienziati che lavorano su questo tema, programmando il futuro delle scienze che cambieranno il nostro stile di vita.

Innanzitutto, dobbiamo dire che la nanotecnologia è la scienza che interessa tutto ciò che è ridotto alla nanoscala. Per coloro che non se ne intendono, un nanometro equivale a 10-9m. Sappiamo che tutto ciò che è ridotto alla nanoscala cambia le proprie caratteristiche, sia nel colore

es and books or articles having limited access to Science Direct thanks to the collaboration with the Faculty of Chemical Engineering and Environment Protection of “Gh. Asachi” Technical University from Iasi; in Italy we also had the opportunity to contact the Dept. of Chemical Sciences of the University of Catania where we met some researchers that showed us how they work, the instruments they use for their research and various experiments.

che nella temperatura di fusione. Ci sono tre principali tipi di nanostrutture: Nanoparticelle(0D), Nanotubi(1D) e Multilayers(2D) (Fig.2).

Dunque, per le loro proprietà le nanostrutture entrano in dricerche di ambito diverso.

Le nanotecnologie saranno adoperabili in diversi settori industriali, le loro possibilità non conoscono limiti. Per questa ragione, gli studiosi stanno provando a trovare nuove applicazioni per i nanomateriali.

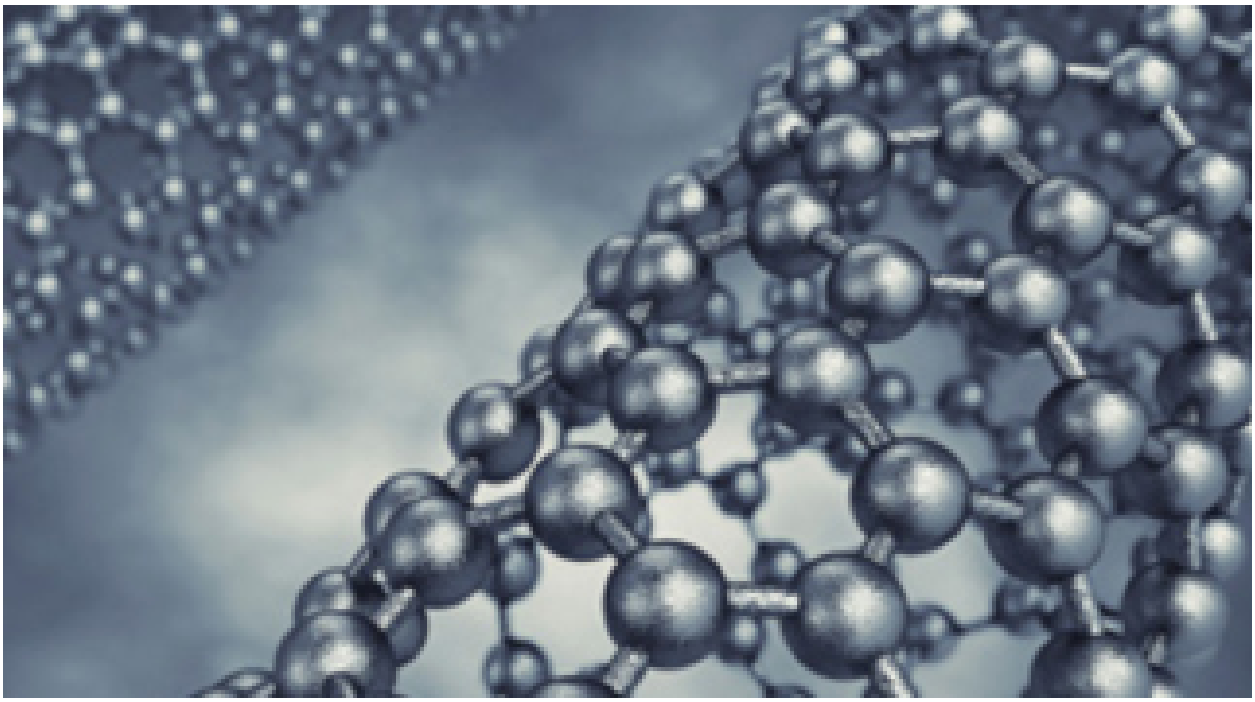

Fig 2
Carbon Nanotubes
Nanotubi di carbonio

What is Nanotechnology

In 1965, Richard Feynman, receiving the Nobel Prize in Physics for his fundamental work in quantum electrodynamics, had a brilliant idea that led to a new age in the world of physics. He pronounced a phrase that described perfectly the way how scientists were looking around them, stopping them to a macroscopic level.

In his opinion “There is plenty of room at the bottom”; in fact, he was speaking about nanomaterials in a very imaginative way. Because of his idea, nowadays there are a lot of scientists working on this topic, planning the future of sciences which will affect our lifestyle in an unrecognizable way.

We must say that a nanometer represents the billionth part of a meter (10-9), everything

Nanotecnologie in Medicina

Il Professore di Bioingegneria Todd Coleman e l’Ingegnere John A. Rogers hanno portato avanti una ricerca che si è conclusa con l’elaborazione di un particolare nanochip chiamato EES (epidermal electronic system). Questo dispositivo potrebbe essere in grado di monitorare i segni vitali del nostro corpo e di indirizzare le informazioni assimilate direttamente al nostro telefono o al medico curante. EES sarà in grado di identificare eventuali malfunzionamenti dei nostri organi, muscoli strappati, ossa fratturate o articolazioni in posizione innaturale (Fig.3).

Un’altra rilevante ricerca è quella che interessa particolari polimeri coinvolti nel trasporto di specifici medicinali. La loro manipolazione può portare ad una più precisa localizzazione dei

reduced at nanoscale changes its properties: changement in color and melting point. There are three main kinds of nanostructures: Nanoparticles (0D), Nanotubes (1D) and Multilayers (2D). So, for their properties these nanostructures are involved in lots of researches in each area.

Nanotechnology will be available to a wide range of industries and it really there are no limits to what it is capable of. For this reason scientists are trying to find new applications for nano-materials. That's why the use of nanomaterials can be unlimited.

farmaci, garantendone dunque una maggiore efficacia.

In futuro potremo essere in grado di guarire le nostre ferite velocemente grazie a nuovi sistemi: si tratta di un particolare principio (aluminosilicate) che potrebbe essere inserito in specifiche bende. Per quanto riguarda le ossa fratturate si stanno portando avanti degli studi che prevedono l'uso di nanotubi per la ricostruzione artificiale, totale o parziale, delle ossa.

Grazie alle nanotecnologie potremo vistosamente velocizzare gli studi inerenti i vaccini.

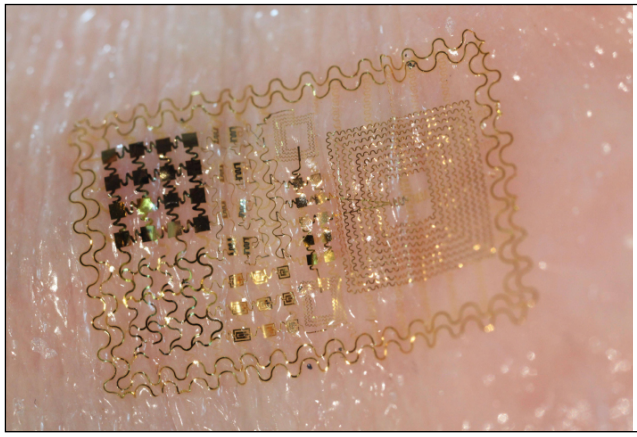

Fig 3
EES - Epidermal electronic system

Nanotechnology in Medicine

Bioengineer Professor Todd Coleman and engineer Professor John A. Rogers carried out a research that revealed an application for particular nanochips EES (epidermal electronic system) that could be able to monitor the vital signs of our body directly on our phone or send them to a doctor who is thousands of miles away. Nanites will be able to address whether there are any broken bones, torn muscle tissue, irregularities, monitoring metabolism or cholesterol levels, making sure that the organs are working properly, and any other type of requirement for a healthy body.

Long-circulating polymeric nanotherapeutics have acquired increasing interest in research and clinic owing to their capability to improve the solubility and pharmacokinetics of therapeutic cargoes. Modulation of carrier properties promises more effective drug localization at the disease sites and can lead to enhanced drug safety and efficacy.

In the future, we will be able to heal our wounds a lot faster thanks to new nanotechnological delivery systems that will be sown into bandages and will contain a drug called aluminosilicate, which promotes fast regeneration capabilities and will allow wounds to heal faster. In order to heal broken bones, companies are developing nanotubes to provide bones a proper structure so that they can grow back as they are

Infatti, per le ridotte dimensioni delle nanoparticelle, sarà possibile creare centinaia di vaccini destinati alla sperimentazione. Quest'ultima sarà notevolmente accelerata poiché, una volta iniettati i vaccini nelle cavie, si potrà vedere se tra questi ne è presente uno efficace; in caso positivo si andrà avanti dividendo in due sottogruppi i vaccini ed identificando, tramite lo stesso processo, in quale gruppo si trovi quello efficace, fino a rintracciarlo.

Purtroppo gli studi concernenti la nanomedicina sono rallentati dagli eventuali effetti collaterali che potrebbero provocare sul nostro organismo. Tutto ha dunque bisogno di essere accuratamente testato prima di essere commercializzato.

Nanotecnologie nella prevenzione del crimine

In futuro potremo avere accesso a particolari dispositivi da adoperare per la prevenzione del crimine. Per esempio, i nano-trackers potrebbero essere inseriti nei prigionieri per evitare che questi tentino di evadere. I nano-trackers potrebbero essere adoperati anche per marcare i prodotti di un negozio, al fine di rimpiazzare gli attuali codici a barre. Per quanto riguarda la sorveglianza, in futuro saranno create telecamere sempre più piccole (nanocams) (Fig. 4).

Nanotecnologia nell'industria bellica

supposed to. Coupled with other medicines, we may one day even be able to grow entire bones back in a very short period of time. Nanotechnology will greatly speed up the process of creating vaccines because, being so tiny, it could be possible to load thousands of nanites with thousands of different vaccines and inject them into the host all at once and see if any of them work. If it works, we could then narrow down our results by trying the same experiment on a new subject and only using half of the original vaccines. If it still works, then you can keep narrowing it down; if it does not work, then you know that the vaccine you want is in the second experiment and you could then use the same process to narrow down those vaccines instead.

All the studies concerning nanomedicine have slowed down. This has happened because all new nanomaterials have to be tested on our body, to prevent any negative effect, before being launched in the market.

Nanotechnology in crime prevention

In the near future we might have access to some particular devices that could help us prevent crimes. For example, some nano-trackers could be injected to prisoners in case they try to escape. These nano-trackers could also be used to mark store items and track them in case of stealing. Currently bar codes are black bars of different widths but in the future we might have new ones that will be a fraction of a nanometer in size and contain a new array of unique colors; this will help us fight counterfeiters. As for surveillance, one day there will be smaller and smaller security cameras (nanocams) we will not be aware of.

Nanotechnology in weapons

With the new nanites, the human kind will be able to create new weapons with unbelievable properties: for example nanites will not only be able to crack into the computers but also in the human body and this new technology could be used to read someone's thoughts and manipulate the information they have access to.

A new way of designing and using nanotubes has been discovered. At the moment, we only have heavy protection that our security personnel wear; but in the future there could be another type of body-protection that is based on nanotubes, which are tiny, crystalline structures made on a nanoscale which in fact is a hundred times stronger and 6 times lighter than steel. That will lead us to a higher protection level meanwhile working at the best possible way.

Nanotechnology will definitely be used in warfare; sadly we won't be able to keep track

Con le nuove nanoparticelle l'intelligenza umana sarà in grado di creare armi con incredibili proprietà: per esempio le nanoparticelle saranno in grado di penetrare non solo nei computer

Fig 4
Nanocam

ma anche nel corpo umano.

Questa applicazione potrebbe anche essere usata per leggere nella mente di qualcuno e per manipolarla (Fig.5).

È stata sperimentata una nuova modalità di creazione di corazze militari a base di nanotubi. Al momento le nostre Forze dell'Ordine indossano solamente pesanti protezioni; in futuro potrebbero esserci protezioni centinaia di volte più resistenti e sei volte più leggere.

Questo potrebbe garantire una maggiore protezione e, nello stesso tempo, una maggiore facilità di uso.

Infine, le nanotecnologie saranno adoperate nell'ideazione e nella produzione di armi con conseguenze non sempre positive.

Da un canto sarà possibile evitare disastri nelle centrali nucleari, dall'altro alcune persone potrebbero approfittarne per creare armi nucleari per la distruzione di massa.

Nanotecnologie nell'industria tessile

Un giorno saremo in grado di produrre tessuti resistenti all'acqua e al fuoco.

Ciò sarà possibile perché, una volta ridotte alla nanoscala, le fibre tessili saranno disposte in maniera da impedire il passaggio delle molecole

of nanites possessors in case someone does something bad with its power. On the bright side they might be used in nuclear facilities to aid humans with radiation problems, but since there is always a darker side too, some people could use it to create nuclear mass destruction weapons.

Nanotechnology in clothes

Someday, tying the fabrics together at a nanoscale, we will be able to create new clothes that will be stain, water and fire proof. When you get to nano-scale, physics will get to the next level in the way that liquids will be too large to get through.

Nanotechnology and energy

As the trees and flowers from our planet can grab atoms from soil air and water, rearrange their position in such manner that they create something new including oxygen, someday nano-factories will be able to take atoms from inexpensive materials that are already present into the atmosphere, such as dirt, air and seawater to create clothes, food and medicine.

Yi Cui, an engineer at Stanford University, leads a research team about how materials can store and conduct electricity; this new kind of material can store up to ten times more energy than a common battery. So far, they have come to a point in which they can make a material that is capable of conducting electricity as light as paper. The technique used is called e-Textile and basically it uses a compound in addition with a porous textile material to create new materials that can be used from daily use articles to luxury ones such as casual clothing to formal suits. This technique is still in its infancy state, but the gamma-range surprises us day-by-day with its potential. For example, one day we will be able to recharge our mobile phones or our portable computers by simply putting them into our pockets. Another positive aspect of this invention could be saving all the materials needed to create classic type of lithium batteries.

Nanotechnology in oil industry

Nanotechnologies will be able to help human work in oil industry.

Particular nanostructures have been discovered, called nanocoatings, that have strange properties, that of facilitating oil extraction. Let's see the different applications for nanocoatings:

- Anti-wear for drilling parts will increase the durability in moving parts just spraying it on them;
- Nanovar provides strength, hardness, and thermal resistance which are three requirements needed in oil drilling in the future to reach

d'acqua, ormai troppo grandi.

Nanotecnologie ed energia

Come in natura gli alberi sono in grado di estrarre atomi dal suolo, dall'acqua e dal sole per creare qualcosa di nuovo, un giorno, grazie alle nanotecnologie, anche noi riusciremo ad estrarre atomi da materiali comuni presenti nell'atmosfera, al fine di produrre energia.

Yi Cui, ingegnere alla Stanford University, sta portando avanti una ricerca sulla possibilità dei materiali di immagazzinare e condurre energia elettrica; uno dei primi risultati è stato la scoperta di un nuovo tipo di materiale in grado di immagazzinare una quantità d'energia pari a dieci volte una comune batteria. La tecnica usata è chiamata e-Textile e si basa su un tessuto poroso destinato a creare dai più lussuosi ai più comuni capi

Fig 5
Brain network

d'abbigliamento. Questo progetto è ancora in via di sviluppo ma potrebbe dare vita a una vasta gamma di prodotti innovativi. Ad esempio, un giorno saremo in grado di ricaricare i nostri cellulari semplicemente mettendoli in tasca. Un altro aspetto positivo di questa invenzione è il risparmio di tutti i materiali necessari per la creazione delle tradizionali batterie al litio.

Nanotecnologie nell'industria petrolifera

Le nanotecnologie saranno in grado di agevolare il lavoro dell'uomo nell'ambito delle estrazioni e delle raffinazioni petrolifere.

Sono state scoperte particolari nanostrutture di nome nanocoatings, che hanno straordinarie proprietà. Vediamo le principali:

- Lo spray anti-usura per gli ingranaggi incrementerà la resistenza delle parti mobili;
- I nanovar incrementeranno la durezza, la forza e la resistenza termica, principali requisiti della strumentazione destinata all'estrazione del

reserves;

• Anti-corrosion coatings will allow an object to resist corrosion from air or even from water.

We know that often when oil companies extract oil from the ground or underwater, they must deal with gases, metals, water, and many other types of invasive substances present in the oil. Because of this, the oil industry has had to come up with a variety of methods to clean out all of the excess materials that they do not want in order to get pure oil. Nanotechnologies will facilitate all the process of filtration.

To increase knowledge about oil wells in an attempt to recover more oil from wells, Rice University is working on "nanoreporters". These nanostructures are made up of hundreds of millions of carbon clusters. Each reporter is approximately 30,000 times smaller than a human hair. These "reporters" are designed to change their molecular makeup depending on what they encounter – water, petroleum, hydrogen sulfide, etc.; they are also given tags, similar to barcodes, which can tell scientists how long they have been underground. Lastly, they are being designed to be able to report properties about the material they are currently near to, with the ability to report temperature and pressure; they can relay valuable information to scientists. With a better idea of the physical properties of an oil reservoir, operators will have a much easier time finding and recovering oil.

Nanotechnology in sport equipment

Nanotechnology could also be used in sport. It has created light weight and much stronger materials in many different sports including golf, football, swimming, etc. obtaining the hoped success. A company called Nanodynamics is working on the improvement of the golf ball with nanotech by enhancing energy transfer between the club head and the ball. They are also changing the weight of the ball by making it hollow so that it has less spin, resulting in straighter drives

Conclusion

In our opinion, nanotechnology will revolutionize many different scientific fields, improve out healthcare products and, who knows, maybe our longevity. It will probably assist us in making our everyday work easier. It will also help human beings to let their dreams and ideals become true such as conquering the vast, dark and unknown universe. On the other hand, despite its use for good, someone may manipulate its power and use it to harm others. However, since we are in the second decade of the 21st Century, we should put aside the problems we are not able to

petrolio;

• Coperture anti-corrosive permetteranno ad un oggetto di resistere agli agenti atmosferici.

Sappiamo che una delle maggiori difficoltà che le compagnie petrolifere si trovano a fronteggiare è la presenza, all'interno del petrolio, di sostanze invasive come gas, metalli e acqua. Anche in questo caso possiamo trovare una concreta soluzione grazie alle nanotecnologie.

Al fine di facilitare il ritrovamento di riserve petrolifere sotterranee, la Rice University sta

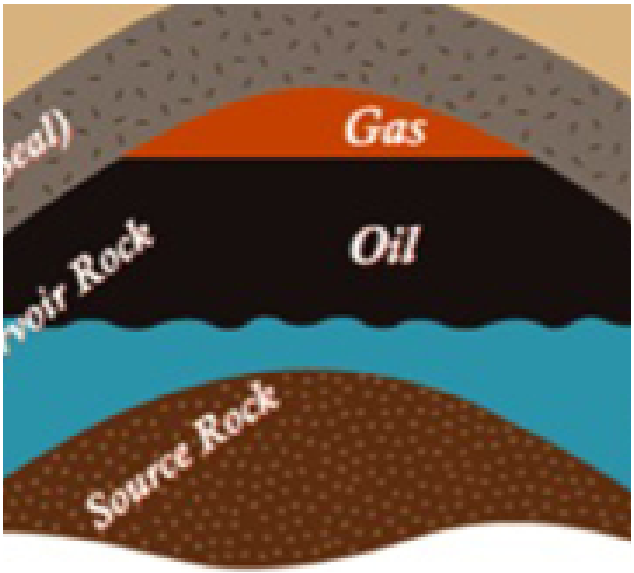

Fig 6
Oil wells
Giacimenti petroliferi

elaborando i "nanoreporters". Queste nanostruturre si compongono di centinaia di milioni di atomi di carbonio.

Ogni reporter ha una dimensione approssimativamente 30.000 volte più piccola di un capello umano. I nanoreporters sono disegnati in maniera tale da reagire in caso di un incontro con i diversi elementi, cambiando dunque caratteristiche fisiche. Infine, i nanoreporters sono in grado di riferire le caratteristiche dei materiali con cui reagiscono. Ciò potrebbe notevolmente semplificare il lavoro delle compagnie petrolifere (Fig. 6).

Nanotecnologia nelle attrezzature sportive

Le nanotecnologie potrebbero inoltre essere adoperate nell'ambito dello sport.

Ad esempio, da parte della compagnia "Nanodynamics" sono stati ottenuti rilevanti risultati per quanto riguarda le palline da golf, incrementando il trasferimento d'energia dalla mazza alla pallina. Si sta anche modificando il peso della pallina rendendola più leggera, in modo tale da

foresee and move out of the dark ages of the last century. We should assume the risks and move forward, because we might someday bring the humanity to its brightest and highest potential in terms of technology and life-care. By looking back in time, we can see that there cannot be any revolution without risks, as someone wise said “no pain, no gain”.

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Fig 7
Nanotechnologic golf balls
Palline da golf nanotecnologiche

evitare la sua rotazione nei lanci lunghi (Fig. 7).

Conclusione

Secondo noi le nanotecnolgie rivoluzioneranno diversi campi scientifici, migliorando la salute e magari aumentando la longevità. Esse probabilmente ci aiuteranno a rendere più semplice i lavori di tutti i giorni. Aiuteranno l’essere umano a realizzare i propri sogni, come conquistare il vasto, oscuro e sconosciuto universo. Da un altro canto qualcuno potrebbe manipolare la potenza delle nanotecnologie al fine di contrastare o dominare altri esseri umani. Dovremo comunque momentaneamente mettere da parte le imprevedibili conseguenze delle nanotecnologie e implementare la ricerca superando i limiti e le ambiguità che hanno caratterizzato il secolo scorso. Dovremo assumercene la responsabilità e il rischio al fine di portare l’umanità al suo più alto livello di evoluzione tecnologica. Guardando indietro nel tempo possiamo accorgerci che non può esserci alcuna rivoluzione senza rischio. Come afferma il detto Senza rischio non c’è risultato.

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