

Write the Future

OSA's Centennial "Write the Future" contest asked members of our community to imagine, in a short piece of fiction, what optics and photonics might look like in the next 100 years. The result was a variety of creative visions. A panel of judges selected a winner and three runners-up, all of which OPN is pleased to publish here.

Abby's Morning

By Kristian Buchwald

On the ground, Abby began to feel the sharp pain of the scrape on her elbow and the pressure from the handlebars in her side. She could already see her mom shaking her head: "Abby, I know you love archaic technology, but on the day of your interview you really should not take such risks."

Sure, Abby's autonomob could have driven her to her destination with zero risk of any accident. But the sun on her face energized her on the bike ride—and, as an added bonus, powered up the control system of the smart fabric of her sweater. Since the bike was also connected to the traffic awareness grid, the only thing she really needed to do was not do something stupid like hit the curb and fall over.

Which she had just managed to do.

Unwrapping herself from her bike, Abby got up and pulled out a smart plaster from her bag. Immediately after she applied it to her elbow, an orange dot appeared in the upper left corner of the view in her sunglasses. She double-blinked at it and absent-mindedly followed the smart plaster's holo-updates:

RAMAN DIAGNOSIS:
Bacteria identification complete.

MICROSCOPIC ANALYSIS:
Only epidermal damage.

FEMTOSECOND TREATMENT:
Complete.

UPLOAD TO MEDICAL JOURNAL:
Complete.

Back on her bike, she drove the rest of the way without further incident, following the route arrows her



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sunglasses overlaid on her view. 2010 Massachusetts Ave—headquarters of The Optical Society, where she was interviewing for an internship.

OSA was the world's largest industry organization, and Abby hoped for a chance to help organize the 13th Space Optics Conference. The contacts she had gotten at last year's conference had helped her land a part-time job at OptoPropul, the leading supplier of spaceship vehicle propulsion systems, and she wanted to get into this field, one of so many industries advancing the world's technology through photonics. This year, the conference would allow participation either in person or via your optical avatar. More than 30,000 people from 150 countries were expected to attend.

Walking through the OSA front door, the long-distance retina scanner alerted her host of her arrival, the security scanner approved her chemical signatures, and Abby smiled at the thought of her future in optics. **OPN**

WINNING ENTRY

Kristian Buchwald
Ibsen Photonics,
Denmark



Days of Future Bright

By Nicholas H.L. Wong

A hundred years, a thousand years—
We've come so very far,
Developing luminous frontiers
Since we first used our star.
We live in a world full of light,
Evolving as time unfolds.
As humans, we have curious sight
To glimpse what tomorrow holds:

Global communications continue to grow;
The Internet of Things is real.
The world's mostly connected now;
This is a very big deal.
Fiber capacity leaps again,
Shuttling data everywhere each day.
It's petabits and exabits
Through an information hyperhighway.

Our indoor lives have changed a lot;
Our offices and homes are smart.
The fridge calculates without a thought
And advises our next grocery cart.
The lights therein have transformed too,
No longer just lighting the place.
They form local wireless networks to
Connect us to cyberspace.

Consumer devices have reformed how we
Work, learn, game, exercise and live,
From intelligent glass and display technology
To AR and VR, keeping us active.
Integrated optics is much better;
Chip production is large-scale.
Photonics has crept into the computer;
E-mail has become 'P-mail.'

With fossil fuels in dwindling supply,
Our need for renewables is strong.
Nevertheless we do get by,
On green energy all day long.
We've pushed efficiencies long ago
And live sustainably by means
Of wind, geothermal and hydro,
And reliable solar screens.



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Healthcare has been revolutionized
By light in many ways.
Sub-cell structures can be analyzed
With super-resolution rays.
Optogenetics treats addictions;
Lives are saved by laser surgery.
Near-infrared medical contraptions
Monitor blood glucose non-invasively.

Light in the industrial mix
Has uses, and plenty it yields,
Like laser guidance and robotics,
And defensive force fields.
We use it daily in chores, such
As manufacturing en masse.
It's now able to sense so much,
From bridge strain to gravity to gas.

The world that is to come is filled
With abundant possibility.
We have it in ourselves to build
Great things for our posterity.
And so we dream of the allure
Of all things enabled by light.
We know a single thing for sure:
These are the days of future bright. **OPN**

HONORABLE MENTION

Nicholas H.L. Wong
Postgraduate
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There Still Is Light

By Sourabh Kumar

Professor Edward Rome lay supine on the lawn outside the science building, arms crossed across his chest, gazing up at the stars. His countenance conveyed an intense longing; his gaze, a sense of melancholy. Cam sat nonchalantly on a wooden bench, not too far away. It was well past midnight.

They must have decided by now.

Sighing, Rome glanced at Cam. The events of the past flashed before him, scattered and chaotic, tangled with varied emotions. He closed his eyes, straining to organize those events:

“It’s difficult to say when it all started. Human affairs have probably always been precarious. The desire for more incites an endless cycle of exploitation and discontent; the fear of falling behind in turn corrupts the mind. The development of commercial nuclear-fusion reactors, triggered and controlled by ultra-powerful lasers, almost solved the energy crisis. But it couldn’t establish peace. The conflicts between nations continued to rise, leading to immense global insecurity.

“And preparations for war.

“Our lab in robotics, photonics, and artificial intelligence was asked to develop humanoid robots to replace humans in battle stations. Meanwhile, the brain-mapping project had recently been concluded, with remarkable success. Room-temperature, scalable quantum computers, based on the interface between nuclear spins and photons on a silicon-carbide chip, had been demonstrated experimentally, too.

“I had often wondered about creating an intelligent machine that relies on optical communication through waveguides, instead of the electrochemical signals used by our neurons. We therefore set out to manufacture a quantum-photonic humanoid, combining our knowledge from various fields. After a decade of work, I distinctly remember the day when our first such humanoid was ‘born.’ He displayed a much higher intelligence



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than humans. And to our utter surprise, we found that he was conscious. It was the greatest invention of the 22nd century. We named him ‘Cam’—Conscious Automated Machine.

“The government was elated. The officials explained the war situation to Cam, and asked him for help in making strategies. But Cam wouldn’t hear of it. He found human egotism quite puzzling. He spoke of the things that our conscience knows, but that are smothered by the delusion of the ‘special me.’

“Cam touched a few powerful hearts. In an unprecedented move, the government decided to share the technology behind its most prized wartime invention with the belligerent nations, hoping that people would realize the great things that can be done together, if we have the courage to rise above our weaknesses. Hundreds of humanoids like Cam have been manufactured since then.

“Today, a global peace treaty was put forward to all nations.”

Cam’s communication link gave a beep. Rome opened his eyes anxiously. Cam glanced at the message.

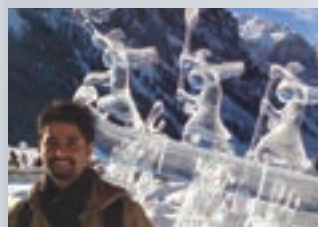
“And?” Rome asked, his voice shaking with anticipation.

“They all signed it,” Cam replied calmly.

Sometimes, Rome thought, *all we need is a wise friend.* He closed his eyes again, and whispered with a gentle smile, “There still is light.” **OPN**

HONORABLE MENTION

Sourabh Kumar
Graduate Student, University
of Calgary, Canada



Journey of a Photon Lifetime

By Edward H. Chen

My life came to a flashing end when I became a speckle in the eye of a young Earthling.

The journey began 13.8 billion years ago, when my lepton parents coalesced to give birth to my siblings and me. In the ensuing years, now known as the “Photon Epoch,” we endured a stifling relationship with our parents, who used us for the sole purpose of communicating with each other. Our seemingly menial task as go-betweens facilitated a scandalous culture in which every parent was constantly pairing with new partners, thereby begetting more photons.

As our parents grew older and less rambunctious, they found monogamy to be a more stable way of life. Although they retained some of us as messengers, the majority of us were freed. We rashly vowed to never fall under their influence again.

I roamed alongside my siblings during the so-called “Dark Ages,” but without our parents we had no means of sharing our experiences. Looking back now, it was the loneliest time of my life. We all longed to reunite with our parents.

But our patience was rewarded, because after hundreds of millions of years, our parents created larger homes in which we found temporary refuge between our destinations. These safety beacons later came to be called stars. Our parents’ imaginations ran amok; they created even larger entities such as galaxies, clusters of galaxies, and even superclusters of galaxies!

Our parents had taught us to practice *moderation* in moderation, but they failed to heed their own teachings. When the clusters they assembled became too unwieldy, our distant cousins, the gravitons, began exerting their collective influence to collapse the clusters into black holes. We soon found out that if any of us were caught within such whirlpools of death, we would never escape.


In one close encounter, we came across two black holes that were so vicious that they even began to consume one another. Many gravitons escaped before the final collision, and we were fortunate enough to leave the scene with only a slight distortion in our intended trajectory. Undaunted



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by this experience, we resumed our exploration of the universe alongside our newfound companions, the escaped gravitons. My fellow adventurers and I meticulously recorded our stories along the way, and we were anxious to find a final resting place for them.

Although we were oblivious to it at the time, our meeting with an oddly shaped object labeled “Voyager I” was a hint that our expedition was nearing an end. Within a few hours, we came across the Laser Interferometer Space Antenna and, with significant assistance from our telecom cousins, our companion gravitons successfully found refuge in it.

I finally entered the Earth’s atmosphere and imparted my own experiences to the Earthling. She now studies effects I had never encountered before—such as using entanglement between photons for metrology, and creating devices to generate *deterministic* photon-photon interactions. She helped me realize the overarching purpose of my existence: to tell stories across the endlessly fascinating universe. 

HONORABLE MENTION

Edward H. Chen
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“WRITE THE FUTURE” JUDGES

Michael Duncan, Senior Science Advisor, OSA

Joseph Eberly, University of Rochester (USA) and OSA Centennial Advisory Panel

Kandace Nachtrab, Centennial Staff, OSA

Armand Niederberger, LEIA, Inc. (USA), and OSA Centennial Advisory Panel

Stewart Wills, OPN Editor and Content Director, OSA

