

#TECHNOLOGY

Sharpest Image Ever

Astronomers are able to estimate a star's mass by comparing its observed brightness and temperature with theoretical predictions.



By harnessing the capabilities of the 8.1-meter Gemini South telescope in Chile, which is part of the International Gemini Observatory operated by NSF's NOIRLab, astronomers have obtained the sharpest image ever of the star R136a1, the most massive known star in the Universe. Their research led by NOIRLab astronomer Yenu M Kalari, challenges our understanding of the most massive stars and suggests that they may not be as massive as previously thought.

Astronomers have yet to fully understand how the most massive stars - those more than 100 times the mass of the Sun - are formed. One particularly challenging piece of this puzzle is obtaining observations of these giants which typically dwell in the densely populated hearts of dust-shrouded star clusters. Giant stars also live fast and die young, burning through their fuel reserves in only a few million years. In comparison, our Sun is less than halfway through its 10-billion-year lifespan. The compact, densely packed stars, relatively having short lifetimes and vast astronomical distances makes distinguishing individual massive stars in clusters a daunting technical challenge.

By pushing the capabilities of the Zorro instrument on the Gemini South telescope of the International Gemini Observatory, operated by NSF's NOIRLab, astronomers have obtained the sharpest-ever image of R136a1 - the most massive known star. This colossal star is a member of the R136 star cluster which lies about 160,000 light-years from Earth in the center of the Tarantula Nebula in the Large Magellanic Cloud, a dwarf companion galaxy of the Milky Way.

Previous observations suggested that R136a1 had a mass somewhere between 250 to 320 times the mass of the Sun. The new Zorro observations however indicate that this giant star may be only 170 to 230 times the mass of the Sun. Even with this lower estimate, R136a1 still qualifies as the most massive known star.

Astronomers are able to estimate a star's mass by comparing its observed brightness and temperature with theoretical predictions. The sharper Zorro image allowed NSF's NOIRLab astronomer Yenu M Kalari and his colleagues to more accurately separated the brightness of R136a1 from its nearby stellar companions which led to a lower estimate

of its brightness and therefore its mass. "Our results show us that the most massive star we currently know is not as massive as we had previously thought," explained Kalari, the lead author of the paper announcing this result. "This suggests that the upper limit on stellar masses may also be smaller than previously thought."

This result also has implications for the origin of elements heavier than helium in the Universe. These elements are created during the cataclysmic explosive death of stars more than 150 times the mass of the Sun in events that astronomers refer to as pair-instability supernovae. If R136a1 is less massive than previously thought, the same could be true of other massive stars and consequently pair-instability supernovae may be rarer than expected.

The star cluster hosting R136a1 has previously been observed by astronomers using the NASA/ESA Hubble Space Telescope and a variety of ground-based telescopes but none of these observations could obtain images sharp enough to pick out all the individual stellar members of the nearby cluster.

Gemini South's Zorro instrument was able to surpass the resolution of previous observations by using a technique known as speckle imaging, which combines ground-based telescopes to overcome much of the blurring effect of Earth's atmosphere. By taking many thousands of short-exposure images of a bright object and carefully processing the data, it is possible to cancel out almost all this blurring. This approach as well as the use of adaptive optics can dramatically increase the resolution of ground-based telescopes as shown by the team's sharp new Zorro observations of R136a1.

"This result shows that given the right conditions an 8.1-meter telescope pushed to its limits can rival not only the Hubble Space Telescope when it comes to angular resolution but also the James Webb Space Telescope," commented Ricardo Salinas, a co-author of this paper and the instrument scientist for Zorro. "This observation pushes the boundary of what is considered possible using speckle imaging."

Zorro and its twin instrument Alopeke are identical imagers mounted on the Gemini South and Gemini North telescopes respectively. Their names are the Hawaiian and Spanish words for 'fox' and represent the telescopes' respective locations on Maunakea in Hawaii and on Cerro Pachón in Chile.



Tiger close to the road and human habitation becomes the chief cause of conflict.



Sunayan Sharma
IFS (Retd.), Ex field director project tiger Sariska & Kooladoo national park, Biharatpur

Strangely Fateh Singh Rathore, the then Field Director of Sariska's personal invitation to visit the reserve during severe hot weather conditions was gladly accepted by Shri Venkatraman, the then hon'ble President of India. This information brought huge embarrassment to the government of Rajasthan which had been bypassed by Mahamahim as well as Fateh Singh, an officer of this very government.

The Home Minister and the higher bureaucracy wished to fix Mr Singh (Futji), their old enemy, in this case while the CM wanted this crisis to pass away without inviting much discomfort to himself politically. There was one more crucial issue that was worrying the CM. In fact in last few years several marble (dolomite) mines had been sanctioned in the peripheral forest areas of the Sariska Tiger Reserve.

A piece of high importance

The mining and revenue departments of the state worked hand in glove in allotment of these mines. These mines were owned by several big shots including powerful politicians. Futji, after his joining the Sariska, picked up this issue but very shortly found out that it was almost an impossible task and not to be tackled at administrative level. The fighter Futji used Rajendra Singh (who later on became recipient of the prestigious Magsaysay



Heavy traffic on SH-13 at Madhogarh, a constant source of irritation to tiger.

And now at this crucial juncture tiger - king of the jungle, suddenly jumped in on the scene. A shepherd boy was mauled by a tiger in the vicinity of Madhogarh village located on the Sariska-Alwar highway, not far from the Field Director's Headquarters at Sariska. The boy had received severe injuries. It was a second case in recent times as few months back a seer was mauled and killed by a tiger on the same road, merely few kilometers from the spot where this boy was mauled. This second case had further fumed the villagers of Madhogarh and neighbouring burgs.

Tiger Attack A Blessing In Disguise For The Government (...2)

#FUTJI-TALES

alike a pawn reaching the position of queen most powerful piece in the game of chess.

The CM, his entire machinery and the mining lobby wanted to get this trip cancelled but so far had failed in their attempts.

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protests on the highway. These agitations in the face of the proposed visit of the President, were another thorn in the flesh for the already puzzled government. The boy was being given medical treatment and assurances were given to provide adequate compensation to his kins but the politically charged agitation could not be subsidised for the want of fulfillment of their demand for shooting the tiger and nobody could dare issue such orders for the fear of anticipated severe criticism by the wildlife conservationists at international level.

The matchless support In such a hot situation the then Chief Secretary visited Sariska to have a last minute feedback about the arrangements made by the district administration and especially the CWLW to ensure the dignitary's visit a success. It was a highly complex situation as none from the Governmental machinery except the Superintendent of Police wanted shooting orders for tiger to subside the villager's agitation but this demand could not be met by the CS. On the contrary he gave clear instructions that none should dare shoot the tiger without obtaining

On 8 April 1993, the apex court closed down all these marble mines, bringing joy to the entire nature conservation community across the country.



World Letter Writing Day

For hundreds of years communication took place through just a couple of ways, you either sat down and had a conversation with someone or you wrote your thoughts and feelings down on a letter and had it delivered to them by courier. The nature of letters made them incredibly intimate as each carried the indelible mark of its creator. Digital media just doesn't quite carry the same personal level as this old method, and World Letter Writing Day is your opportunity to remember the wonders of the hand-written words.



Villagers & their cattle are prone to the attack by carnivores inside the Reserve.



Sariska is blessed with huge Sambar population.

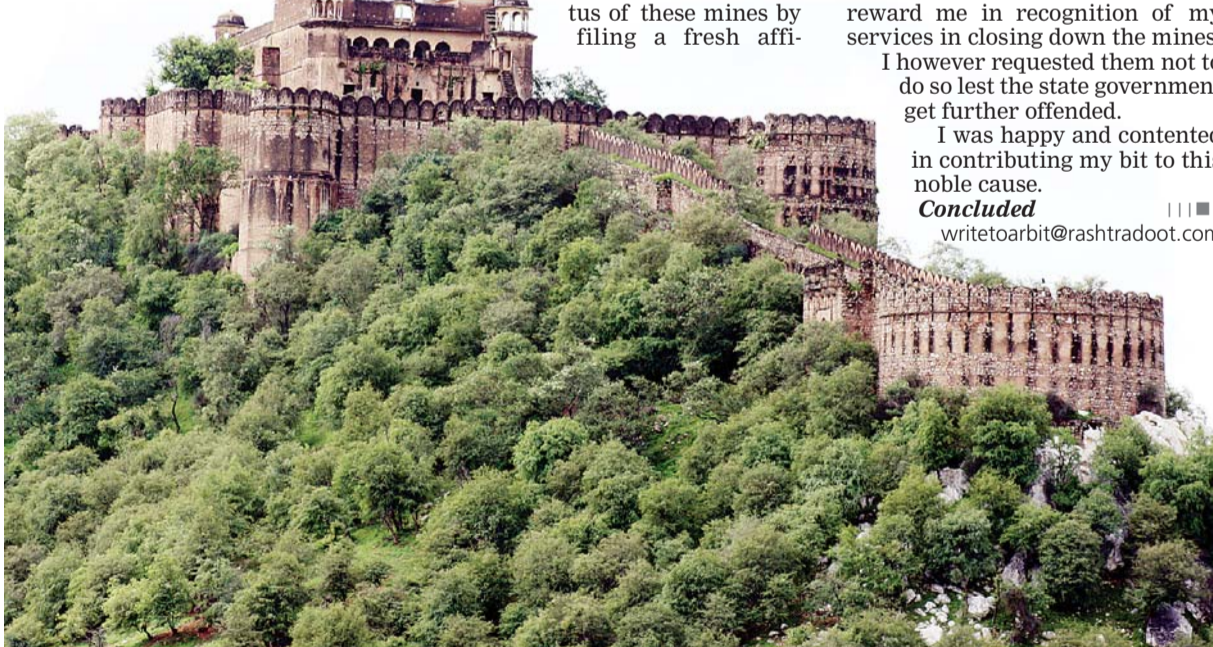
written permission from the CWLW, who is empowered for such orders under the Wildlife Protection Act 1972. And the CWLW could not take any chance without recommendation from the Field Director who vehemently opposed shooting of the tiger, drawing swords with the government.

In this indecisive situation the CS left to Alwar and his car was attacked with lathis by some agitated villagers. Fortunately, the witty driver could safely pull through the crowd.

Every body was upset by this new development but the sharp-witted CM hailed it as a blessing in disguise. Citing the complexity arisen from this public agitation he remained successful in convincing the Mahamahim to postpone his trip to some other favourable time, bringing peace to the power corridors after a fortnight's tension, unrest and nervousness.

Now it was the turn of Rathore's enemies. Though he was not alone and continued to enjoy support from some powerful people at the National and International level; yet he lacked the matchless support of Shri Rajeev Gandhi. And therefore before he could reinforce his fort he was to be knocked down.

This removal from Sariska Tiger Reserve was the 1st step in this direction to deprive him from enjoying any support from the Prime



Kankawadi Fort in the heart of Sariska's Core Area.

Minister of India, as a Chairman of the Steering Committee of the Project Tiger in India. The priority mission Thus Futji's narration and the ground truth before me brought the answer as to why the government was in such a haste to discharge him from this position, using me. I insisted with him to show me around the Park and brief me about the important tasks he thinks of priority in the interest of Sariska. He was not in a mood to enter the Park. I could appreciate his emotions. He did not even agree to a formal farewell in his honour arranged by the staff there. But spared enough time to share with me the mining case pending in the apex court.

He motivated me to accord highest priority to close down these illicit mines. And I took it as a mission. Being the Field Director of Sariska, I was not merely the respondent no.1 in this case but also was made officer incharge (OIC) of the case by the state government.

I as the OIC, filed an affidavit stating that these mines were sanctioned on the notified forest lands falling under the Tiger Reserve. The furious government appointed additional OIC, now from the mining department, who refuted the forest status of these mines by filing a fresh affidavit, contradicting the earlier version of the government filed through me. The Forest Secretary asked me to file another affidavit to request the apex court to allow the mining in the interest of the government but how could I do so against my conscious? I was under tremendous pressures from the government as well as the powerful mining lobby, threatening me with dire consequences. Fortunately, the CWLW was supporting me.

At one point of time the petitioner seemed to be losing the case but my affidavit changed the complexion of the case, hyping ire of the powerful lobby and the government. The government advocate too threatened me to initiate a case of criminal breach, of trust against me. He alleged that I had been helping the petitioner by briefing him all through the proceedings and especially on my affidavit at the crucial stage of the case. He claimed that otherwise the mine owners and the government would have won the case.

On 8 April 1993, the apex court closed down all these marble mines, bringing joy to the entire nature conservation community across the country. I as the OIC, had lost the case but as incharge of the Tiger Reserve had won the case in the interest of wildlife conservation and particularly tiger. Alike Fateh Singh Rathore, this time I was on the radar of the powerful lobbies and was bound to face music at their hands. But God helped me as the truth and sanity prevailed. Government of India wanted to reward me in recognition of my services in closing down the mines.

I however requested them not to do so lest the state government get further offended. I was happy and contented in contributing my bit to this noble cause.

Concluded
writetocarbit@rashtrdoot.com

#ARCHITECTURE

Alluring Stations Around The World

Take time to enjoy the journey at these awe-inspiring stations.



Liège-Guillemins Railway Station.

Beautiful train stations are arguably a city's most treasured architectural landmark. With non-stop flights going seemingly everywhere, people tend to prefer the sky over the rail. That said, there's something nostalgic and even glamorous about boarding a train that simply cannot be replicated in any other form of transportation especially planes which are getting more modern by the year. After all, trains are often credited with completely transforming the United States in nearly every regard (socially, politically and economically) during the most financially lucrative period, the Gilded Age.

And with the popularity of trains on the rise throughout the latter half of the glittering 19th century, some of the stations are unsurprisingly beautiful works of architectural magic. From the celestial inspired frescoes on the towering ceilings to the glossy red brick floors, these eye-catching beautiful train stations are proof of the economic boom such transportation hubs introduced.

World Trade Centre Transportation Hub

Architect Santiago Calatrava's highly anticipated World Trade Center Transportation Hub opened in March, in Lower Manhattan. The centerpiece of the project is the 800,000-square-foot glass-and-steel structure known as the Oculus. The hub connects 11 subway lines, the PATH train, the Battery Park City Ferry Terminal and several downtown buildings. The soaring main hall features white marble floors and a 355-foot retractable skylight. The Oculus is also now home to the 365,000-square-foot Westfield World Trade Center mall, which opened in August.

Kuala Lumpur Railway Station

Designed by a British government architect named Arthur Benison Hubback and opened in 1910, the Kuala Lumpur station in Kuala Lumpur, Malaysia, is a neo-Moorish delight, a fantastical agglomeration of minarets, dome-capped pavilions and articulated archways. Now more of a hub for commuters than tourists, the magnificent white-and-cream Anglo-Asian station is still worth a stop.

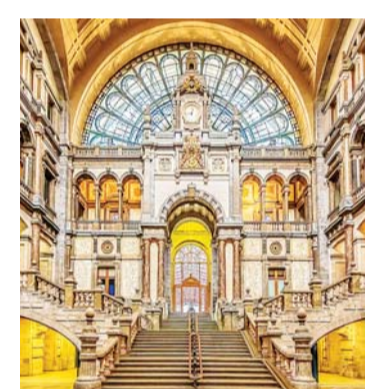
Kanazawa Station

When Kanazawa's circa 1893 station was upgraded in 2005, the initial reactions were mixed. The addition of the ultra modern glass-and-steel dome and giant drum-shaped wood gate struck many as ill-fitting. But visitors continue to flock to the Ishikawa,

Japan station's dramatic add-ons and the new structures' allure competes handily with the historic town's other attractions, including a geisha district and former samurai quarters.

Antwerpen-Centraal Station

The glorious waiting hall of the Antwerp station completed in 1905, is lavishly adorned with more than 20 kinds of marble and stone but what keeps this from feeling ponderous is the counterpoint of soaring arched windows and skylights that fill the concourse with light. The upper train platform too features a magnificent vaulted iron-



Hungerburg Station

Architect Zaha Hadid first made her mark on Austria's Innsbruck region with the 2002 Bergisel ski-jump tower. She returned with this design for the Nordpark Cable Railway, a four-station funicular line that replaced a 100-year-old tram and transports passengers up a vertiginous incline for 1.1 miles. Each of Hadid's stations is capped with swooping glass shapes that suggest ice flows and snowdrifts. The view of Hungerburg Station, the final stop in the funicular's ascent was completed in 2007.

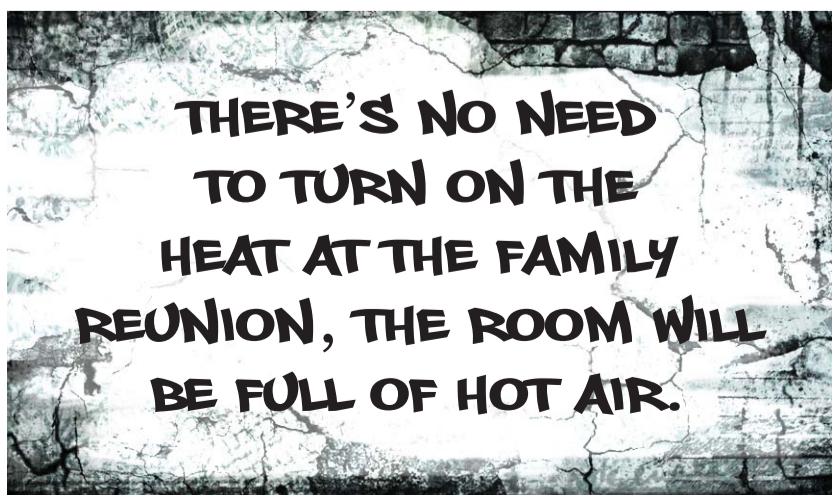
Sirkeci Railway Station

As Istanbul's gateway to Europe, the magnificent Sirkeci station was appropriately a melding of French Art Nouveau and Ottoman aesthetics. When it opened in 1880, was considered quite modern for its time, boasting 306 glass windows and stoves imported from Austria. The station which stands at the foot of the Bosphorus Strait, features bands of bricks across its facade, clock towers and stained-glass windows. The station served as the terminus for the famed Orient Express, which connected Paris's Gare d'Est to Turkey in an 80-hour journey, until the line stopped serving Istanbul in 1977.



Kanazawa Station.

THE WALL



BABY BLUES



ZITS



By Rick Kirkman & Jerry Scott

By Jerry Scott & Jim Borgman